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8 printers under the scope.

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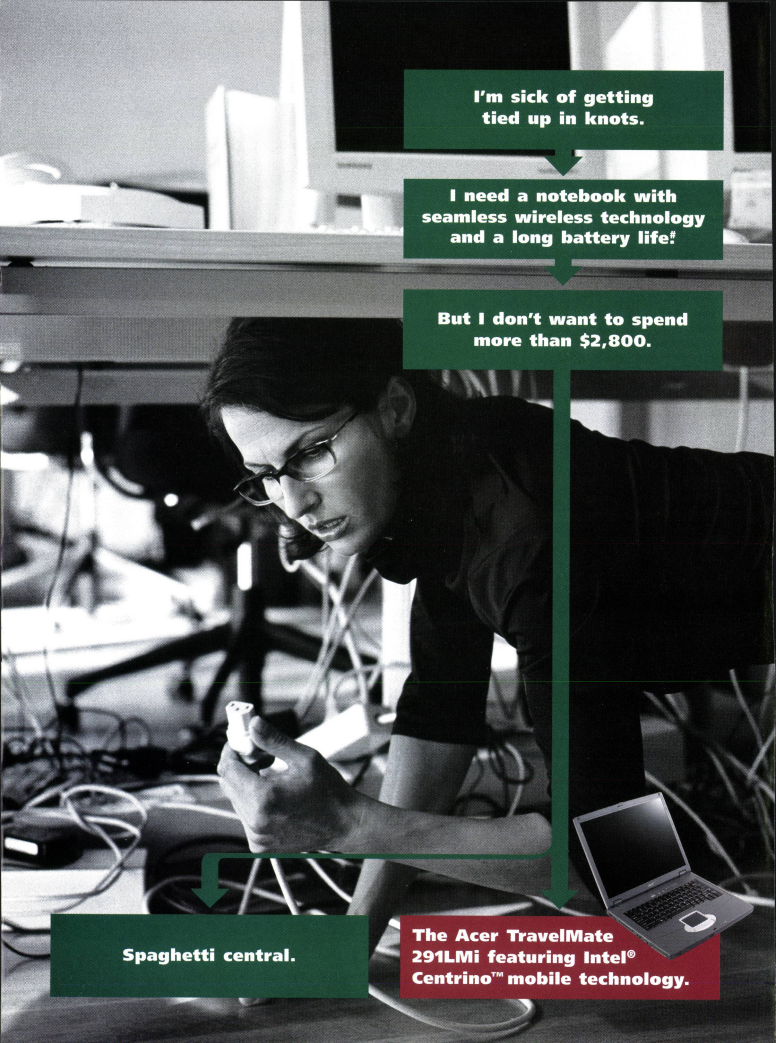
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This month's cover stories

The Linux Factor

Does Linux have what it takes to break away from its geek roots and win mainstream appeal?

17in TFT test

LCD monitors use less desk space, are cheaper to run, and are easier on the eyes than CRTs. *Jarrod Spiga* puts 15 17in screens to the test.

Web authoring 68

Creating an effective Web page is not as difficult as you might imagine. *Daniel Winter* tests 14 Web authoring applications to make your site stand out.

Photo printers 56

As the cost of digital cameras continues to drop, *James Eke* examines a selection of printers capable of turning your images into perfect prints.

Plus

Home or away 18

Offshoring tech jobs to India could mean the career death knell for current and future IT professionals. But finding a solution isn't easy. *David Braue* reports on changes to the local tech landscape.

Fuel for thought 22

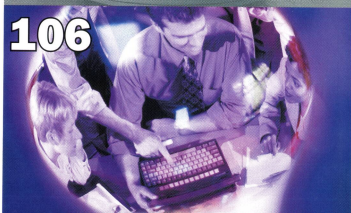
Mobile computer makers are turning to environmentally-friendly fuel sources to radically extend battery life. *Simon Sharwood* reports.

Sub-$2,000 servers 90

The server is the backbone of any business's IT infrastructure. *David Lin* looks at 10 servers that are suitable for small to medium enterprises.

Agile computing 106

EXtreme Programming has emerged as a grassroots solution to software development cost blowouts. *Simon Sharwood* jumps on the bandwagon.



On Test

Reviews

Development 1 Home Media Centre
Australia's first all-encompassing entertainment box.

MiTAC Mio Digiwalkers

MindManager X5 Pro

Fastora NAS T2 and Squirrel Backup

Dell OptiPlex GX270

Western Digital Series II USB hard drive

Apacer Disc Steno CP200 portable CD burner

Pinnacle Studio 9

Ulead MovieFactory 3 Disc Creator

Avocent SwitchView IP

and more. . .

Labs Challenge

Sub-$2,000 servers
David Lin looks at 10 of the best servers to keep small businesses running smoothly.

Virtual PC software
Serdar Yegulalp tests three applications which enable you to create a "virtual PC".

and more. . .

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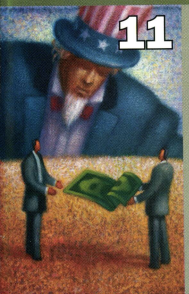
Need to Know



11

- The new Free Trade Agreement between Australia and the US will "harmonise" the countries' online copyright laws.
- February's raids on Kazaa mark a turning point in the worldwide anti-piracy campaign.
- An Australian-made open source cryptography tool with the unlikely name of Bouncy Castle is on track for world domination.
- Notices are appearing online offering bounty money for anything from quick-hit coding jobs to catching cyber criminals.

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Workshop

Online communities
Jarrod Spiga begins a four-part series on building communities using online journals, forums and news management tools.

Windows registry recovery
"Unrecoverable error" messages strike fear into the hearts of every computer user. But *Serdar Yegulalp* shows that all is not lost.

Upgrading to Windows SBS 2003
A reliable server is a vital part of a successful business. *Paul Schnackenberg* upgrades to Small Business Server 2003.

Emailing with handhelds
Jenneth Orantia demonstrates how to make the most of your downtime by using your PDA to handle email on the go.

Omnis Studio 3.2.1
David Williams shows how to get up-and-running fast with Omnis Studio 3.2.1, a powerful and intuitive Web-based Rapid Application Development tool.

Digital watermarking
Many people have concerns over the security of electronic communication. *David Emberton* illustrates how to keep prying eyes away.

and more. . .

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TechLife

Games 136
Secret Weapons Over Normandy; EA Cricket 2004; Black Hawk Down: Team Sabre; Arc: Twilight of the Spirits.

Books 140
The Semantic Web; Internet Security; Going Wi-Fi; .NET and J2EE Interoperability; Apache Cookbook.

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APC's privacy statement is on page 143.

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Build and develop your Web site with ASP.NET Web Matrix and trial versions of Macromedia Dreamweaver MX 2004, Macromedia HomeSite 5.5 and more.

Server environments

Power your site with this collection of server tools including ActivePerl, Microsoft .NET Framework and Xarka OptiPerl (trial version).

Utilities

Add flair and keep your pages in top form with these freeware tools including CoffeeCup Free DHTML Menu Builder, CSE HTML Validator Lite, HTML Tidy and Weblink Checker.

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Omnis Studio 3.2.1 SE

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ACDSee 4.0

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Whip your digital photo collection into order with this popular and quick image viewer and manager. Use it to enhance and batch process photos, create slideshows for presentations and take advantage of the handy print options.

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Full CD index

CD 1

Full-working version

- Omnis Studio 3.2.1 Standard Edition — full-working version
- Omnis Studio special offer

Feature

Linux documentation

- Apache HTTP Server Documentation v2.0
- Debian GNU/Linux Reference Guide
- Linux Kernel manual pages 1.66
- Mandrake Linux 9.2 Discovery Guide
- Mandrake Linux 9.2 Reference Guide
- Mandrake Linux 9.2 Starter Guide
- Red Hat Linux 9 Customisation Guide
- Red Hat Linux 9 Getting Started Guide
- Red Hat Linux 9 Reference Guide
- Red Hat Linux 9 Security Guide
- Red Hat Linux 9 System Administration Primer
- Red Hat Linux 9 x86 Installation Guide

MindManager X5 Pro

- Knowledge Link 3.0
- Exclusive special offer

On Test

Reviews

- MindManager X5 Pro
- Ulead DVD MovieFactory 3 Disc Creator

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Ashampoo PowerUp XP 2.0

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For Windows 95, 98, Me, NT4, 2000 and XP.

PAL Computer Surveillance System 2003

Monitor your PC's activities with the latest in spy software technology. Parents and teachers can block Web sites and keywords and have detailed reports sent by email to any address.

For Windows 95, 98, Me, NT4, 2000 and XP; requires online registration.

Unreal Tournament 2004

Try the latest addition to the Unreal Tournament series with the 214MB demo on this month's CD set. UT2004 comes with new weapons, better graphics, controllable vehicles and plenty of intense new game modes.

Linux documentation

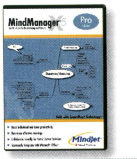
Check out this collection of white papers and manuals from different Linux distributions, including the Linux kernel manual pages, Debian, Red Hat and Mandrake guides and the Apache HTTP Server 2.0 documentation.

Making movies

With this 30-day trial version of Ulead DVD MovieFactory 3, you can burn CDs, DVDs and select pre-made DVD menu interfaces . Read the On Test review on page 50 for more information.

Mindbending offers

Teamlink Australia and Mindsystems are offering *APC* readers exclusive discounts off the latest versions of MindManager X5 Pro and Knowledge Link 3.0 when purchased together. Check out the trial versions on this month's CD and the MindManager review on page 42.



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Full-working versions

- ACDSee 4.0 — full-working version
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APRIL 2004

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Garth Montgomery

Pirates under fire

Has Kazaa reached the end of the gangplank now that the Australian music industry has taken the fight to Federal Court?

Despite Kazaa's overwhelming numbers — 60 million subscribers, 5 million simultaneous users — it continues to be a service that draws immense criticism and now legal scrutiny.

The criticism began with the tech-savvy community. Infuriated by the sneaky spyware bundled in Kazaa Media Desktop (KMD), the Slashdot crowd embarked on a boycott of what it saw as dodgy tactics by Kazaa's owner, Sharman Networks.

The universally-loathed Cydoor and Gain networks had become part of the KMD client, and the details of such "features" were buried in a nearly 3,000 word end-user license agreement (EULA). Unbeknownst to many, installing the KMD client also included reporting mechanisms for advertising servers to track usage patterns and send a barrage of pop-up ads.

There was also the highly questionable Perfect Nav bar, which power users discovered was redirecting URLs through the sites and networks of paid sponsors. Once again, user habits were harvested like crops and sold off to enable Kazaa's owners to drive around in Porsche Boxsters.

Sharman hardly cared that power users were finding alternatives such as BitTorrent, eDonkey and now DK-lite. The KMD was always a dummy's app, and Sharman relied on newbie users who wouldn't read a 16-page EULA.

APC brought you the tale of Melbournian Suzi Davenport, stung by a $10,000 excess usage bill when she thought she'd closed Kazaa but it was actually still active in the taskbar.

Some of the more harsh *APC* readers said Davenport should've learnt to use the software first. I spoke with the managing director of a global Web development software vendor this month. Having held senior positions at top IT vendors, he's no dummy. But when John Treloar received a $1,600 Internet usage bill, he immediately questioned his 13-year old daughter and 16-year old son.

"[The kids] didn't think they were doing anything wrong, but they had no idea Kazaa would allow continued access to the computer. The PC is in the lounge room, but I didn't know it was happening because the app was running in the background."

The University of Minnesota did a study on Kazaa (**www.hpl.hp.com/shl/papers/kazaa/KazaaUsability.pdf**) which concluded that deliberate interface flaws meant users weren't supposed to know that the program provides unfettered access to your computer, exposing — among other things — financial information.

The company is now struggling to save its reputation in the Australian Federal Court. *APC* attended the court-sanctioned raid and the court hearings that followed. And what a dismal showing by Sharman.

The so-called boss, Nikki Hemming, is only the CEO when it suits her to be profiled in mainstream media. When it comes to taking responsibility for defending her company, she claims to only be an outsourced CEO. Even after the Federal Court hearing, we got no indication of who owns the company.

When *APC* asked how Kazaa can monitor its users for advertising revenue purposes, provide rewards for high volume uploaders, and distribute legal software, yet at the same time claim to have no control over its users, we got nothing.

What we did get was a mealy-mouthed US lawyer bumbling on for 10 minutes with garbage that made no sense. He achieved his aim. Half-way through meandering double-speak, the TV cameras switched off. "Too much techie crap," a Channel 10 celebrity reporter said to the cameraman. Except it wasn't.

In January, porn publishers Titan Media reported to US congress that P2P networks could easily detect and filter copyrighted material using the spyware installed on nodes in the network.

The fingerprinting (or hashing) technique described was part of Titan's effort to get its own copyrighted videos off Kazaa.

Of course, Kazaa has no desire to start licensing copyrighted material to ensure its networks are legal. Apple iTunes runs at a loss, its sole purpose being to sell iPods. Legit services like Napster and MusicMatch are laying off staff, with the president, CFO, programming VP, communications VP and a board member walking away from Napster in January.

"I think it's a very competitive market with very ugly economics and there's just no money in downloading," said Steven Frankel, a Boston-based investment banker.

Hemming has always argued that Kazaa appealed to so many users because there was no viable alternative to legitimately downloading music. Now there are plenty, all suffering while the biggest network of all lets unlicensed copyright run wild.

What Hemming really meant, was there's no way she can live large on Sydney's North Shore and drive a Porsche Boxster if her company pays like everyone else.

gmontgomery@apcmag.com

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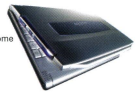

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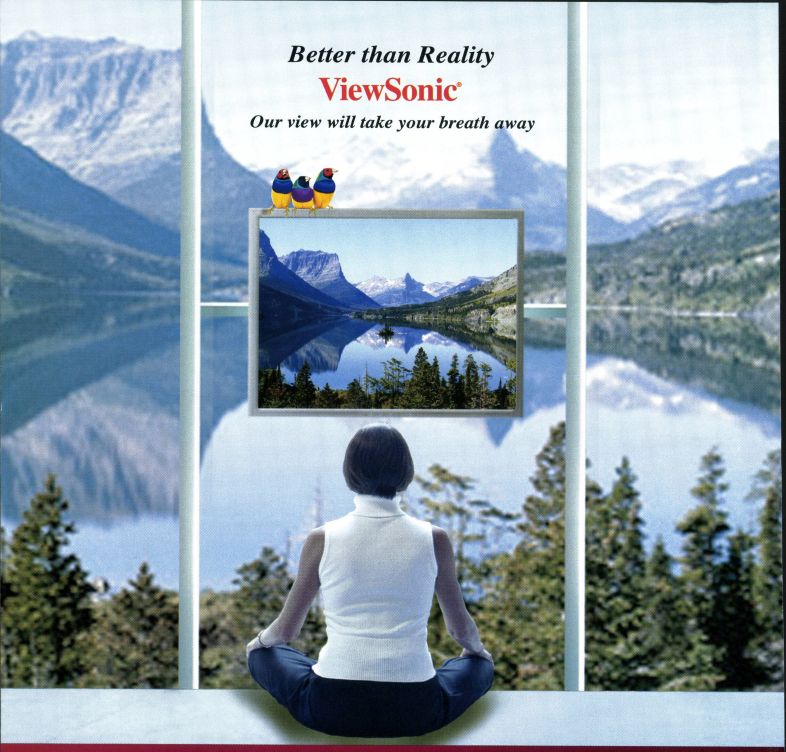

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Need to Know

News, views and analysis from the IT world

US eyes Aussie downloaders

Have Australian Net users and ISPs been dealt the biggest blow yet by the US music industry? *William Maher* reports.

A turning point in the campaign against illegal music downloads is set, with Australia aligning itself more closely with US online copyright law.

In the yet to be finalised agreement, Australia will "harmonise" intellectual property laws with the US, ensuring more protection for copyright owners, including processes to engage ISPs and Net users to deal with copyright breaches.

Critics of Australia's new Free Trade Agreement (FTA) with the US have accused the Government of "blatantly selling out" to the US entertainment industry, warning that more local lawsuits for music downloading are inevitable.

Online privacy advocacy group Electronic Frontiers Australia (EFA) predicts the deal could open the floodgates to legal action against ISPs and subscribers alike, as has happened in the US.

"It will turn the Australian Internet industry into a litigation mill, as well-funded US media groups launch waves of prosecutions against Internet users and ISPs themselves," said the EFA's Dale Clapperton.

"With or without the subpoena issue, if the changes happen the way I think they will, I definitely see ISPs as being worse off," said Clapperton, adding the comment was his personal opinion, not the EFA's.

The proposed changes are being considered cautiously by a jittery Internet industry already reeling from a series of lawsuits, raids and investigations concerning music downloading and illegal file sharing. In February, music industry lawyers alleging involvement in copyright breaches raided the Sydney offices of file sharing company Kazaa, as well as various universities and ISPs.

The raids came as a surprise for some ISPs involved, including Perth's iiNet. "When I first got the phone call I thought, my God, we're going down [the US path]," said iiNet MD Michael Malone. Investigators have stressed that iiNet and other ISPs in the raid are not themselves the target of legal action.

Some warn that copyright owners will

[The agreement] will turn the Australian Internet industry into a litigation mill. . . it's a massive step backwards

The EFA called the deal a "massive step backwards" for Australian IP law, saying its greatest concern is America's controversial Digital Millennium Copyright Act (DMCA). Under the US law, more than 1,000 subpoenas have been issued to ISPs requesting the details of customers believed to be illegally sharing music.

The Australian Government moved to reassure the Internet industry, with IT minister Daryl Williams saying there will be no system where copyright owners can ask ISPs for the names of customers without a court order.

Not everyone is comforted. The EFA has described the comments as "spin" and noted that the subpoena issue was only one concern raised by the prospect of following the US lead on prosecuting music pirates.

be much more aggressive in their pursuit of Australian ISPs once Australia aligns itself with US laws. In the US, ISPs can be made liable for copyright breaches by their customers if they do not comply promptly with orders to have offending material removed.

"Takedown" orders are often submitted to ISPs in Australia, but *APC* understands that ISPs aren't bound by law to comply unless directed by a court. While many do comply, some local ISPs are said to have so far resisted takedown orders.

That could change under joint US rules, says Freehills lawyer Sydney Birchall, who has researched and written about the issue.

"It's sort of like 'delete first, ask questions later', if it's run in that way," he said. "You are

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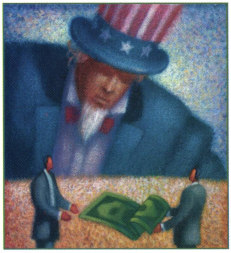

Sell out: *the FTA has been widely criticised.*

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Is my email hot, or not?

In the emerging world of email reputation systems, image is everything.

It's "the Richter scale of email", a 10-point list ranking many of the biggest emailers on a scale from good to very, very bad. You can find Telstra, Microsoft, Qantas and Westpac on the list, plus free email providers such as Hotmail.

SenderBase (**www.senderbase.org**), offers a detailed run-down of a network owner's email history. Score less than three and you can breathe easy; more than six and your email provider might be pumping out more than a million messages a day.

With the right gear you can even receive customised "reputation" scores, ranking emailers from best to worse. CNN gets a very high 7.8, while the CHINANET Yunnan province network gets a -9.9 for alleged spamming.

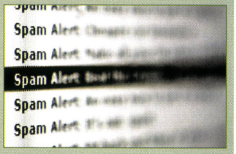
It's just one of a number of emerging reputation systems offering a new spin on the traditionally anonymous world of email. A step beyond IP blocklists, reputation systems promise to vouch for the "quality" of emailers, thus separating spammers from friends.

Emailers can even pay to ensure their email gets gold-star treatment. At Bonded Sender (**www.bondedsender.com**), paying up to US$10,000 guarantees that the scheme's participants won't block your mail. Get caught spamming and you pay a penalty of US$20 per message. Only interested in receiving messages from these cashed-up mailers? Just download a free software plug-in.

The system signals a new level of paranoia sweeping the Internet as spammers continue to find their way past filters and other blocks. "Email authentication without a reputation check is like letting a person into your house when all you know is his name," said Brightmail CEO Enrique Salem.

Recently launched in Australia, Brightmail's (**www.brightmail.com**) reputation service monitors the amount and "quality" of messages from each source. Incoming mail is also cross-checked against a list of approved senders.

Brightmail claims its software filters 15% of the world's email and will offer the reputation service free to its customers, who it says account for 300 million inboxes.



Full to the brim: *users want more than spam on the menu.*

Reputation lists are just one of several new technologies emerging as research labs race to find the next killer anti-spam solution. Some estimates put the number of anti-spam vendors between 130 and 140. "We've all got research labs and we're all going at it," said manager director of Clearswift Asia Pacific, Chy Chuawiwat.

Chuawiwat predicts that there'll soon be a change in the way we accept email. "The future will be encrypted messaging," he said.

William Maher

Continued from page 11

presumed to have authorised an infringement of copyright, unless you comply with the takedown notice regime."

Birchall said ISPs may be unable to avoid the "practical reality" that they have more power to stop file transfers than music companies. "American ISPs have been conscripted into the war on piracy; Australian ISPs may be forced to answer the same call to arms in the future."

Australian efforts to resolve the uncertainty surrounding ISP liability have had mixed success. Amendments to the *Copyright Act 1968 (NSW)* in 2000 have taken some of the blame. A report issued by Gilbert + Tobin lawyer Michael Argy last year stated there is "still some uncertainty. . . about the circumstances in which ISPs will or will not be liable for third party copyright infringement."

A code of practice that would help resolve the issue for ISPs has also failed to materialise. ISPs have still not consented to the agreement, with Internet Industry Association CEO Peter Coroneos saying debate had stalled until the outcome of the FTA was known.

Still, the FTA has heightened worry that the doors could be thrown open to litigation. "The concern was, and is, that 'harmonisation' might be code for adoption of the DMCA approach," says Coroneos.

"To try and import a law that was never designed to deal with issues like peer to peer, into a context where the market itself is moving to address the balance, is untimely, inappropriate and potentially damaging of end-user confidence."

In the US, a bill has been introduced designed to limit the music industry's ability to target downloaders. The music industry is also currently defending an appeal by Verizon Communications which argues laws have been abused in the pursuit of its subscribers. The outcome of that appeal is being closely monitored in Australia, said Coroneos.

"RIAA could well then appeal to the Supreme Court. Alternatively, RIAA could lobby Congress to change the law. All of these things. . . will bring to bear on what pressure if any is brought on ISPs in Australia."

Nevertheless, Coroneos said there was hope from minister Williams' assurances, which he described as "significant". The minister has also promised "procedural fairness" for ISPs subject to a notice and takedown system.

Not all ISPs are convinced either that the prospect of US influence over local copyright laws is such a bad thing. While Pacific Internet CEO Dennis Muscat objects to ISPs being made "policemen" and will oppose subpoenas for customer details without a court order, he is confident not much will change.

"The whole issue around whether we will fall in line — I don't see it affecting our business that much. I actually don't think there's an imminent change here at all," Muscat argued.

However shadow IT minister, Senator Kate Lundy, predicted that smaller ISPs unable to defend lawsuits would be directly harmed if copyright owners were given stronger powers. "Larger ISPs are protected by deep pockets and rooms full of lawyers. But smaller independent ISPs will be particularly vulnerable," she said.

Although Lundy said she would reserve final judgement until the full details of the FTA were revealed, she disputed the government's assurances that the new rules would be fair.

"I'm very wary of this condescending placation of the Internet industry, by a minister who I think is under pressure as to what the ramifications are for not only ISPs, but everyone who operates in the digital environment."

Open up and say Kazaa

February's raids on Kazaa mark a turning point in the anti-piracy campaign.

When the owners of Kazaa were accused in Australia of being the most efficient engine of piracy in history, the company had the perfect opportunity to present evidence to the contrary. For two years, Kazaa has argued with US authorities and the record industry about what evidence they are required to supply to US hearings. To date, no evidence has been put forth in any court.

Now, following the February raids at the company's Sydney-based headquarters, new evidence has been prepared for court hearings. The Australian Recording Industry Association's anti-piracy arm secured a civil search order allowing them to raid Kazaa's premises, as well as 11 other companies which might have evidence to substantiate such a claim.

It was a hell of gamble for ARIA. If the association got it wrong, it could have meant an end to the online piracy debate — in Kazaa's favour. The music industry alone claims piracy on Kazaa has a retail value of $2 billion a month.

Instead, the company — based in Vanuatu for "tax efficiencies", which also provides cover for financial disclosure and company directors — had its lawyers argue that the Australian case was too similar to the US case.

Kazaa lawyers tried to suppress the evidence by arguing that Justice Murray Wilcox issued the civil search warrant without being properly informed about the US case. But evidence tendered in room 23C of the Australian Federal Court alleged that the cases were quite different.

For one, this case was about Australian copyright law being broken. Also, a suit and countersuit action between the Recording Industry Association of America (RIAA) and Kazaa involves Sharman Networks Limited.

Until the Australian case emerged, Sharman Networks Limited was believed to be the sole company responsible for Kazaa. However, a new company emerged in court room 23C. Sharman License Holdings had been quietly registered by the Sharman entity, and both Sharman companies were now listed in Australian proceedings.

Neither the US authorities nor RIAA were notified that a new Sharman company had been registered, despite being engaged in court proceedings. The company also registered the Australian Kazaa domain names to the new Sharman company, which is not listed in the US proceedings.

Independent intellectual property solicitor Adam Simpson said such a move adds a layer of complexity to any proceedings. "It's not an uncommon practice to avoid litigation," he said. "If a company tries to dodge liability after the fact, the court takes a dim view."

Sydney-based law firm Phillips Fox recently filed a trademark for Kazaa with the Australian Trademarks office. A brief of evidence tendered before Justice Wilcox alleges that Sharman was "carrying on business in Australia, or has an intention to do so under the name Kazaa."

The company CEO Nikki Hemming never filed an affidavit in the Australian proceedings. The company CTO Phil Morle filed one, but Sharman counsel chose not to admit it. "It is usual practice to be very careful about tendering evidence by affidavit," Simpson said. "You really need to ensure a witness can be tested under cross examination."

. . . piracy on Kazaa has a retail value of $2 billion a month

Australian authorities also argued that the US case is about Kazaa software, which has dramatically changed in the last two version updates. New features to the software include reward points for high volume traders, virus and spam filters, as well as the bundling of AltNet software to provide legal content.

Central to the case is whether Sharman can control the files traded by the 3 million simultaneous users sharing around 573 million files on the Kazaa network at any one time.

"The Kazaa operation can clearly differentiate between legal and illegal songs," said ARIA piracy investigator Michael Speck. "The same software can distribute legal and illegal content and Sharman freely admits it."

Despite the range of music available on the Kazaa network, Sharman Networks has never sought licensing arrangements with any of the five major record labels. Hemming has repeatedly maintained that the company does not traffic in illegal recordings.

Following February's raids Hemming issued a statement. "It is a gross misrepresentation of Sharman's business to suggest that the company in any way facilitates or encourages copyright infringement.

"Sharman bought the Kazaa software two years ago with the express purpose of building it into a legitimate channel for the distribution of licensed, copyright protected content which in turn financially benefits artists."

Sharman claims Kazaa has more than 60 million subscribers and is the most downloaded program in history — approximately 20 million times per month.

The embattled Internet boss has had little to say since the raids, where she evaded a throng of media at Sharman's front door by using a side exit. She left investigators at Sharman HQ after more than seven hours of being grilled when she was notified that her own home was also being raided.

As Hemming pulled into her driveway, lawyers and investigators had already started examining powerful computers in her home.

Garth Montgomery

▶ ***Victory at last:*** *ARIA piracy investigator Michael Speck outside Federal Court.*

Get a pocket OS

It's the must-have accessory for PC enthusiasts: a mini operating system small enough to carry in your pocket *and* run from the same CD. Bootable operating systems aren't new, but they're taking off with flavours of Linux being created specifically to run from CDs, such as Knoppix and Damn Small Linux. The entire operating system can be as small as 50MB, and can sometimes fit on a business card-sized mini CD. Drop it in your pocket for when you're fixing PCs that won't boot, shopping for a new PC, or just for showing off Linux to friends.

Knoppix — 700MB
Damn Small Linux — 50MB
LNX-BBC — 47.6MB
Feather Linux — 70MB

For a more in-depth guide to Linux, see our wrap-up on page 98.

MS rivals go to combat school

A group of software coders are being turned into a lean, mean, Microsoft fighting machine.

They may not yet have the same slick PR or finances of Microsoft, but Australian open source coders are forming their own "specialist" fighting unit.

Coders got a crash course in lobbying recently, when the Australian Computer Society (ACS) brought together groups such as Open Source Victoria and Linux Australia to form a specialist team. The move is the first step in a campaign to train inexperienced open source software coders in the art of political lobbying.

"They need help. They're software developers, not government lobbyists," said ACS president Edward Mandla. "The ACS is uniting a lot of the OSS groups and associations. They're all out there and they've got their own agendas. Mostly they're not political."

"The team's aim is to make policy units and has its sights on meetings with federal IT minister Daryl Williams and opposition IT spokesperson Kate Lundy," said Mandla. He claims it's the first such move anywhere in the world to unite all the local open source communities and develop a coherent policy. "We're giving them mentors, chairs, advice on how to create a policy, how best to lobby a government," he said.

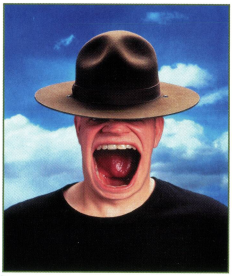
Major trials of Linux are happening now. The Roads and Traffic Authority (RTA) in NSW recently announced a pilot of StarOffice that could see the software eventually running on over 5,000 PCs. Telstra is trialling StarOffice and the Mozilla Web browser on 250 computers.

Morale has also been boosted by an unexpected open source push from the NSW Government. Minister for Commerce John Della Bosca has described IT decisions in the past as "dumb", and said he'll move away from relying on proprietary software.

For Microsoft rivals used to playing the underdog, high profile messages of support like this take some getting used to. "It was a very pleasant surprise. It came out of nowhere," admitted Mandla.

Microsoft has disagreed with calls for governments to legislate open source, saying the decision to choose software should be left up to buyers. Lundy has criticised the comments.

"Microsoft can say that all it likes when it has the market advantage. It's Telstra's line too," she said. "I don't think there is a level playing field at the moment. I think Microsoft was aware of that, and what it fears most is an environment that forces them to compete on fairer ground."



▶ ***Open season:*** *Linux groups are upping the ante.*

For that to happen a new level of professionalism from the IT sector is required, said Mandla. "I think as an industry we've done a very poor job of unjumbling the jargon. We're not good lobbyists, there's not many great achievements that as an industry we can point to in government. We don't have experience in turning things into issues."

William Maher

Is it legal. . . to hack your cable modem?

People have always hacked their PCs, so it's no surprise that modems are now becoming a popular target. A new hack allows people to "uncap" the controversial download bandwidth limits set in place by some ISPs. The hack works with Motorola's Surfboard modems, with users loading custom firmware into the modem memory which is then used to change configuration settings — an action normally reserved for ISPs.

The software is reportedly getting several hundred downloads a day, but Australian broadband user site Whirlpool has urged users to exercise "extreme caution", saying the hack could fry modems or breach ISP rules.

APC spoke to Telstra and Optus about the issue. Predictably, both were less than impressed by the idea — Optus warns it considers the hack a breach of its terms of service. The companies were less clear on the repercussions though, with neither ISP specifying whether customers would lose their accounts.

"At this point in time we are not aware of people adjusting the modem speed in Australia, however if we found this was occurring we would need to assess the situation and determine if any action needs to be taken," said a Telstra spokesperson.

The Australian Communications Authority (ACA) reported that modified cable modems could be in breach of the Commonwealth Telecommunications Act 1997, which has penalties for connecting non-compliant equipment to networks. A carrier could seek compensation if non-compliant equipment causes "harm" to its network.

▶ ***You will comply:*** *hacking your modem could harm more than just your PC.*

As it turns out, modem hacks aren't so useful in Australia, where cable networks mostly run at uncapped download speeds. At best, users could eliminate their 128Kbit/s upstream cap, but it's not worth the risk, says Whirlpool's Simon Wright.

"I genuinely believe that users shouldn't fiddle with this stuff, unless they're willing to end up with a dead modem and a contract to pay out." No, not much fun there.

Exchange: Edward Mandla

The new head of the Australian Computer Society is unashamedly entrepreneurial — and believes IT professionals have to follow suit.

It's no secret that Australia's IT industry has seen better times. An outsourcing-induced IT jobs haemorrhage has exacerbated a high unemployment rate. Optimism might be in short supply, but new president of the Australian Computer Society (ACS) Edward Mandla is determined to change all that. It's just as well he isn't afraid of a challenge.

Mandla's focus is on getting the country's technology minds to be more active in the public eye. "It is time the quiet forward thinkers in our community, ICT professionals, got out of the closet and made a name for themselves by using their talent to shape this nation."

Mandla talked to *APC* about the role he sees the ACS playing in the future.

Do you see the Australian Computer Society taking a more active role in stimulating employment locally?
We're keen to encourage both Government and business to look at Australian ICT providers rather than assume that imported products and services are superior to home-grown offerings. We need to focus on our areas of differentiation — project management, software architecture and testing — as well as niche sectors like biotech or defence technologies.

How much responsibility should Federal Government policy take for our high level of IT jobless?
The ICT unemployment problem is the responsibility of government *and* the industry. We need to work together to assist the jobless and get them back into the workforce.

What's the ACS' position on a scheme for compulsory training or certification for people building or repairing PCs?
Tech and repair is a great way to get a start in the industry. The ACS has to be tough on membership and admission and requires qualifications and experience. Unfortunately, that means many technicians may not qualify when maybe they should. We could create a technician's stream with pathways to further education and we would

It's time IT professionals got out of the closet. . . and used their talent to shape this nation

get the benefit of the technician's view in formulating our policies.

Each technician who became a member would be bound by a code of ethics and subject to a disciplinary committee if they were not working within an ethical framework.

The ACT recently legislated in favour of open source software in the provisioning process. Do you think this issue will benefit the local IT industry? If so, how?
I have no doubt that OSS will develop local jobs. OSS will restructure software companies to the same degree that open standards restructured the propriety hardware companies. One of the key differences in this ICT restructure will be the winners — indigenous software developers of any country. Australia needs to take a leadership role in OSS, and the ACT decision and the bill in South Australia are very exciting developments.

Should local companies get any special support to break in to global markets?
We should do whatever we can to encourage local companies to target offshore markets.

In government, the enemy is often panel contracts and entrenched views that multinationals are a safer bet. Panel contracts preclude people being entrepreneurial and breaking away to create new companies as it can take years to get on a contract. As for risk, with the evaluation processes large organisations go through, there is limited risk in buying Australian.

What agendas will define the ACS direction in 2004? What are the key issues the industry faces?
With Gartner predicting that up to half of all technology suppliers will disappear by the end of 2005 due to vendor consolidation and job losses, it seems certain that life in ICT will continue to be nothing if not interesting.

We will involve our members more in developing policies for specific technologies as well as broader issues such as ICT literacy in schools and the ethical and privacy implications of technology convergence.

By raising the standing of ICT in the community, we will increase credibility in our profession and opportunities for all ICT professionals.

Edward Mandla spoke to Justin Kranzl

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ASIS is Australia's overseas intelligence collection agency.

Bouncing to crypto world domination

An Australian-made open source project is set to become one of the world's leading cryptography tools.

Originally created in 2000 by the Legion of the Bouncy Castle, a group of four Melbourne programmers, Bouncy Castle (**www.bouncycastle.org**) is a set of cryptography APIs for Java. Frustrated by US restrictions on the export of cryptography technology, the Legion wrote its own toolset so its Java programs could enjoy the same strong encryption enjoyed by overseas colleagues.

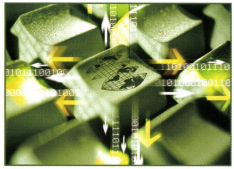
Jon Eaves, a member of the Legion, said the software provides an open source implementation of the Java Cryptography Extension (JCE). The software supports a host of cryptography standards including X.509, S/MIME, CMS (PKCS7), OCSP and OpenPGP. Version 1.22, released in February 2004, added support for the El Gamal public key exchange scheme in the OpenPGP library as well as providing some extra support for X.509 certificate creation.

Bouncy Castle competes head on with offerings from RSA and others, but has beaten out its commercial competitors to find favour with businesses worldwide.

"We know of a Fortune 500 company in the US which has a team of 20 people working with Bouncy Castle for its internal projects," said Eaves, who also has a day job with global system integrator ThoughtWorks. Other open source cryptography products such as TinySSL use Bouncy Castle's APIs too.

Sun recommends the use of Bouncy Castle in an online tutorial, while the company's Java forums are littered with hundreds of posts from enthusiastic users swapping information on how to put the software to work.

A US-based user recently ported the lite version of the Bouncy Castle API into C#, making Bouncy Castle available to millions of Microsoft programmers worldwide and offering the possibility of even wider adoption.



▶ ***Keys to the world:*** *the Bouncy Castle project is making a name for itself all over the globe.*

Eaves sees the C# port as welcome recognition of the quality of the software, the effort that goes into it (users have never had to wait more than four months for a new release) and the need for security tools on all platforms.

However, the Legion isn't looking for glory: "We do it because it is an interesting set of problems to solve, not because we expect to be famous," said Eaves.

Simon Sharwood

PC gunslingers for hire

Notices are appearing online offering bounty money for anything from quick-hit coding jobs to catching cyber criminals.

DO MICROSOFT'S DIRTY WORK

Finally, a reason to cheer about those Windows worms causing havoc around the Web. With police so far failing to achieve much success in finding the culprits, Microsoft has stepped in with a cool US$5 million reward fund.

There are three assignments all up, with $250,000 on offer in each case. Supply information leading to the conviction of the person who released the MSBlast, Sobig or MyDoom.B virus and the cash could be yours. Oh, and if you wrote the virus, you're not eligible.

HUNT THE HACKERS

SCO is another software vendor offering cash to successful virus hunters. Its Web site was knocked offline by a spate of Web attacks led by the MyDoom "A" variant, sometimes known as Novarg or Mimail.

The list of potential suspects is huge — SCO has been the target of a Web backlash over its recent criticism of Linux. There are thousands of irate software programmers out there who want SCO's site down. Good luck.

CODERS FOR CASH

Lots of private open source projects are voluntary efforts, but for a dedicated code wizard there's money on offer. South African Mark Shuttleworth has a US$100,000 budget set aside for programmers willing to help out on one of his many projects, and has already forked over €37,200 to the first successful bounty hunters.

The stakes rise according to the coding challenge, with offers ranging from mini bounties to substantial cash rewards. There's US$200 if you can speed up message filing in the Mozilla Web browser, and up to US$9,500 for some algorithm work.

PICK A PRIZE

The GNOME (**www.gnome.org**) team working on Linux desktop integration has gone bounty crazy, posting 45 different prizes for coding work online, from US$15 jobs to US$2,500 mind benders. It even setup an IRC channel on **irc.gimp.org** for the hunt, where contestants could hang out and discuss strategy.

The deadline for entries had passed at the time of writing, but there may be a chance still — the list showed many of the bounties were unclaimed.

▶ ***Mercenary with a mouse:*** *cash up for grabs for coders.*

Data Dump

Number crunch

Number of broadband access providers in Australia:	**Number predicted to enter market in 2004:**
More than 300	**100**
(Source: BuddeCom)	
Amount Microsoft ordered to pay for infringing patents with Internet Explorer:	**Microsoft's revenue in Australia for last financial year:**
US$521 million	**AU$261.5 million**
	(Source: ASIC)
Amount computer viruses cost global business in 2003:	**Third quarter profit for antivirus software vendor Symantec:**
US$55 billion	**US$111 million**
(Source: Trend Micro)	
Top selling PC vendor in Australia during Q3 2003:	**Market growth since same period in 2002:**
HP, with 19% share	**20%**
(Source: IDC)	

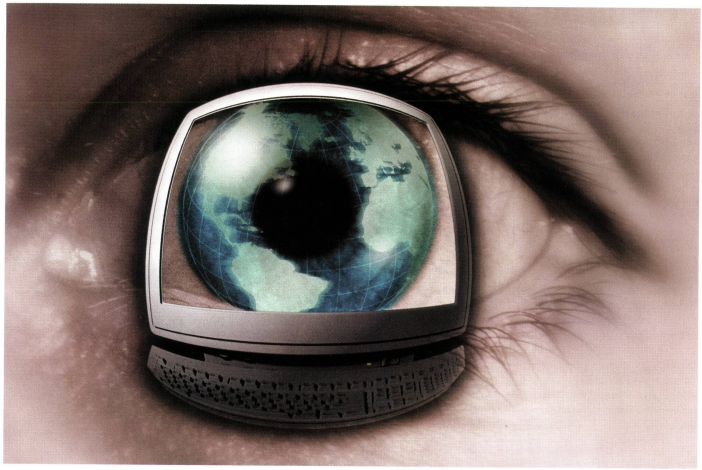
$55,000

Is the amount of damages paid by Sydney computer retailer Big Ben Computer for pre-loading unlicensed copies of Windows onto customers' PCs. Big Ben also paid a $10,000 settlement to Microsoft in 2001.

Quote file

"Two years from now, spam will be solved."

Is Bill Gates cuckoo, or has he just been spending far too long hanging out in Microsoft's research labs? The big man is excited about some new anti-spam ideas Microsoft is working on, one of which involves making spammers pay to send email.



Home or away?

Offshoring tech jobs to India could mean the career death knell for current and future IT professionals. But finding a solution isn't easy. *David Braue* reports on changes to the local tech landscape.

All across the developed world, communities where staple industries once thrived on pride and hard work have fallen victim to the unfeeling dynamics of globalisation. In the US, General Motors' closure of 11 car manufacturing plants laid off 33,000 people, sending their jobs to inexpensive Mexico. In Sheffield, England, the local steel industry evaporated as cheaper foreign competition sounded the death knell.

Back home, the 1999 closure of BHP's steel works in Newcastle erased 85 years of history and 2,500 jobs. Textile producers in Australia and elsewhere struggle to compete against the industrial might of China, which ABN-Amro recently reported as manufacturing 68% of all imported clothing and footwear sold in Australia. Even agricultural jobs have been axed in many countries, where it's cheaper to import produce from other countries than to pay people to pick locally grown fruits and vegetables.

Such a phenomenon was traditionally limited to blue-collar workers who, cold economic theory says, can be easily replaced with trained workers making less money in other countries. But it now looks like the information technology industry could join the ranks of the myriad industries that have suffered as manufacturers discard local allegiances in pursuit of ever-higher profits.

IT offshoring came into vogue in the lead up to the turn of the millennium. Fostered by the Indian government, it built up a multi billion-dollar industry providing the services of skilled developers that could pore over millions of lines of code looking for potential problems. Even as the new millennium began, however, it was clear that the short-term need for extra hands on deck was turning into a major new business issue.

Telstra, which rang in the new year by announcing both record profits and the announcement that it, and outsourcing partner IBM Global Services, would move 450 IT jobs to India to cut costs, has reignited national debate over just how much intellectual capital Australia can afford to hand over to the forces of globalisation. With elections looming this year both here and in the US — where several states recently legislated an outright ban on IT

offshoring — the issue is shaping up to have significant political clout.

At stake is the future of IT, an industry that critics say has suffered at the hands of a largely lacklustre coalition Government. IT has been roped into its whole-of-government cost cutting rather than building a coherent and progressive policy to boost local industry. Foreign IT vendors and service providers continue to beat out local providers for government contracts with chilling regularity, and with the rise in offshoring, it now looks like even the once-sacrosanct area of IT jobs is coming under the hammer.

SEEING THROUGH THE IT MIRAGE

Offshoring couldn't have come at a worse time for the industry, which is still reeling after the dot com bust slowed investment and pitched telecommunications — one of Australia's core competencies — into chaos. Figures recently released by the Australian Computer Society (ACS) showed that unemployment among ACS members is 10.6%, almost twice the national rate of 5.7%.

Worse still, such high rates of unemployment made prospects grim for the thousands of students who flooded into university courses on the promise that rewarding and lucrative careers in IT awaited. Today's students, no longer believing that to be the case, are keeping away from IT in droves: NSW universities saw a 25% drop in IT first preferences during 2003 and a further decrease of 24% in 2004. IT first preferences for this year fell by 22% in Queensland; Monash University in Victoria reported a decline of a whopping 30%.

In this context, the growing corporate trend towards offshoring IT expertise has potentially disastrous implications: if Australian students keep defecting from the field, Australia's already shaky position in the world IT sector will degrade even further.

IT and labour groups have been up in arms at the news Telstra will offshore many of its IT positions, as much for what this represents as for the job losses themselves. Telstra, after all, has been seen for decades as a proving ground for the young telecommunications engineers who've gone on to build Australia's expertise in IT. With the pressures of privatisation pushing the giant telco to move jobs offshore, that role will be significantly diminished, with considerable long-term implications.

Mike Gadiel, deputy assistant secretary of the Labour Council of NSW, believes Telstra and its majority owner, the Commonwealth, owes it to Australians to keep these opportunities open.

"People have seen a lot of blue-collar jobs shifted offshore, and we were promised that they would be replaced by information worker jobs," he says. "Now we're seeing that promise isn't coming true, and information worker jobs are going as well. A company like Telstra, which enjoys a lot of support and derives significant profit from a position of market dominance, ought to be investing in Australian skills, Australian knowledge and Australian capability in the IT area."

Like-minded organisations, including the Community and Public Sector Union (CPSU), Association of Professional Engineers, Scientists and Managers (APESMA) and ACS, have joined the cause, making noise about the dangers of offshoring and gearing up to start intensive lobbying campaigns aimed at getting politicians to understand the dangers of allowing IT jobs to slip overseas.

The ACS has formed a policy-making focus group and will shortly release an 85-page report from Whitehorse Research assessing the economic impact of several possible offshoring models. For its part, the CPSU has been talking with universities and student groups under the auspices of its Save Oz Jobs Campaign Committee.

Details of the campaign are still emerging, but it's clear that IT interest groups — who've become used to being ignored by government policies — aren't going to take this issue lying down. Backed by growing public uneasiness about the implications of the Howard Government's recent free trade deals with the United States and Thailand, anti-offshoring forces may find themselves riding a perfect storm into an election season where lobbying could actually create a profile for the normally invisible IT industry.

"This might be the first ever IT election issue we've had," says ACS national president Edward Mandla. "We all learned at university that markets fix everything and governments shouldn't intervene, and IT has for so long been in the back rooms that we haven't provided governments with the data for rational decision-making. However, we're now talking about a segment that employs 250,000 people, and since university we've learned that governments have a critical role to mentor and shape a nation."

To be fair, Mandla lays some of the blame on an IT industry that has so far failed to impress on business and government leaders how important the sector is to our economy. But that could be about to change, as continuing union pressure pushes the issue into the forefront of politicians' minds.

At its January national meeting, the Australian Labor Party — which has always been ready to criticise the Liberals' IT policies — passed an anti-offshoring resolution that mirrors similar legislation recently passed by several US states. There, offshoring has become so common that Gartner recently estimated one out of every 10 jobs with US-based IT vendors and service providers would move offshore — as would one out of every 20 IT jobs within private enterprises.

Such a diminution would be a serious problem for Australia's much smaller IT industry. If Labor can tap into the broad nationalistic sentiment that stirred up blue-collar support in the past, the party could use IT offshoring as the perfect example of the Coalition's dilution of Australia's intellectual capital.

India's Big Four	Revenues (US$)	Number of employees	Employees in Australia	Australian customers
Tata Consultancy Services	$963.0 million	24,000	200	American Express, ANZ Banking Group, CUSCAL, Hutchinson Telecommunications, National Australia Bank, Westpac Bank
Infosys Technologies Ltd	$750.7 million	21,000	100	Suncorp Metway, Vodafone, Telstra
Wipro Technologies	$590.5 million	27,200	25	Six customers (not named)
Satyam Computer Services Ltd	$424.4 million	12,000	50	Ford, Coles Myer, General Electric, Royal Sun Alliance, Telstra, National Australia Bank

FACING UP TO REALITY

Even as anti-offshoring forces gather strength, the beneficiaries of offshore outsourcing are waging their own war for politicians' hearts and minds. Companies such as Tata Consultancy Services, Wipro and Satyam — among the many Indian companies whose success is expected to drive the Indian offshore services market to be worth US$13.8 billion by 2007 — all operate in Australia and have worked hard to assuage critics.

Sunil Mehta, vice president of peak Indian IT body the National Association of Software and Service Companies (NASSCOM) recently told *The Australian* that NASSCOM was concerned about Labor's "protectionist" resolution and believes Australian government contracts should be open to all comers.

"Any company owned by the government or by the private sector should be allowed to source talent anywhere," Mehta said. "Artificially preventing a company from doing that is doing an enormous disservice to the taxpayers. It is up to any economy to decide whether it wants to be a global economy or not."

Although it's by far and away the largest beneficiary of offshoring, India isn't the only voice in the debate. Russia and China, where programmers get paid even less than in India, are both laying down plans to get in on the action. Hong Kong services firm Bamboo Networks has recently sent a scout to open an office in Australia.

However, companies from those countries have a steep learning curve. Many Indian firms have spent years refining development methodologies and quality assurance policies that are critical for winning deals with offshore customers. Their commitment is reflected in the fact that more than two-thirds of the world's 120-odd companies certified to the stringent CMM-5 (Capability Maturity Model Level 5) development methodology assessment standard are based in India.

And it shows: by and large, businesses dealing with Indian companies report satisfaction with the quality of the product, although some found cost savings were elusive and that they could have done a similar job inhouse. And with an estimated two million new IT graduates every year, India has a virtually unlimited supply of highly skilled talent to draw upon.

Just two Australian companies have achieved CMM-5 compliance. So could the real problem be that Australia's IT industry has simply fallen behind, becoming uncompetitive with the likes of quality-minded India?

If this is the case, a Labor win could be the nail in the coffin of our local IT industry. Although it might save jobs in the short term, the long-term implications of such a move would be far more worrisome: tit-for-tat protectionism in other countries would lock Australian companies out of lucrative offshore IT service contracts, where our overall project management expertise has been capitalised upon to great success in areas such as civil engineering and mining.

A McKinzie Research report last year named Australia as the world's fourth-largest per capita producer of IT services, with a US$400 million surplus reflecting our skill in applying IT to solve real-world problems. Given numbers like this, Mike Nahan, executive director of the Melbourne-based Institute for Public Affairs, believes Australia needs to accept that offshoring is an inherent part of global capitalism and focus on where it can add the most value: applying innovation to IT.

"Unlike car manufacturers in Australia, which were born on the basis of protectionism, IT does not have a culture of protectionism," Nahan says. "Just because some jobs move to India doesn't mean fewer jobs in Australia. The local industry will differentiate itself, and industry as a whole will benefit from having a more effective and competitive IT industry. In the past, our industry has proved to be competitive, innovative and flexible and will continue to be so. [IT] is a growing business."

Just how the offshoring debate will be resolved isn't clear, but it's certain to remain a contentious issue as further studies and posturing ignite the debate on both sides. Meanwhile, Australian IT workers will likely have to watch and weep as more and more jobs leave the country for cheaper locales. In the long term, though, Australia may well recover. EOTE

Offshoring: for and against

FOR

- ☺ **Lower cost:** overseas labour is significantly cheaper than Australian labour, allowing foreign service providers to charge half the hourly rate of a comparable Australian provider.
- ☺ **High quality:** recognising the need to sell a quality solution, IT service providers in India have achieved accreditation to project management quality standards such as the Six Sigma and Capability Maturity Model (CMM) at a speed unmatched by companies in Australia or elsewhere.
- ☺ **Best practice:** many offshore service providers and vendors are developing areas of expertise in certain industries or business processes, building on their past experience in certain sectors. This expertise can benefit companies by guiding their process towards global best practices.
- ☺ **Time to market:** countries like India and China have a virtually bottomless pool of IT expertise. This means that offshore providers can bring large numbers of people into a project to get it completed faster than would be possible with a limited, local team. This results in shorter time to market, which can help the bottom line.

AGAINST

- ☹ **Dilution of inhouse IT skills:** companies that outsource IT services may soon find their collective IT knowledge has declined. This can interrupt long-term strategic IT planning and make it difficult to sever dependencies on outsourcers down the road.
- ☹ **Loss of control:** eager to please, offshore companies work hard to become part of their customers' culture. Satyam, for example, has built a virtual Telstra office to house the more than 150 workers it won in a recent deal. However, offshore development means key parts of the business are being developed and managed half a world away, and it's easy for local executives to lose track of what's happening.
- ☹ **Intellectual property security:** every company guards its critical business information fiercely, and establishing outsourcing relationships exposes that information to potential compromises. This is particularly worrying when it's being used in another country where intellectual properties laws may not be as strict.
- ☹ **Political ramifications:** Australian companies relying heavily on offshore labour risk being seen as unpatriotic, which can hurt the business image.

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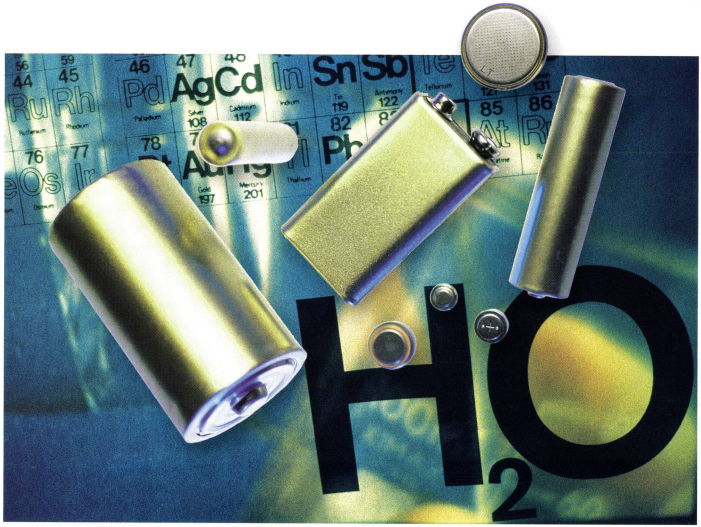

Fuel for thought

Mobile computer makers are turning to environmentally-friendly fuel sources to radically extend battery life. *Simon Sharwood* reports.

Dr Sukhvinder Badwal is very excited about the results emerging from a Melbourne laboratory which indicate that small phials of methanol could erase the battery life problems of laptop computers forever.

"I believe we can power portable electronic devices for six or seven times longer than is possible today with conventional batteries," he says. "We can also achieve dramatically shorter recharge times."

Such predictions are exciting, but perhaps the best news of all is that Badwal's are rooted firmly in reality: Badwal is the leader of CSIRO's Energy and Environment Technologies team, a group that has developed real, working prototypes of micro fuel cells, the technology which promises to deliver the vastly extended battery life that has its leader so excited.

Fuel cells work by exposing hydrogen or a hydrogen-rich substance such as water or methanol to a catalyst, which strips off an electron to produce electricity. The hydrogen then passes through a membrane which conducts protons, eventually meeting air on the other side. The only by-products of this process are heat and water, making them a very attractive alternative to fossil fuels and chemical batteries.

The technology is also considered a prime candidate to replace batteries in portable electronic devices because filling up a laptop with a fuel cartridge offers greater convenience than carrying around a power cord and finding a power outlet, then waiting for a battery to recharge. Fuel cells can also produce more power than batteries, a quality which has attracted the attention of several manufacturers who hope to release fuel-cell powered laptops some time this year.

Toshiba is the most prominent backer of the technology. In March 2003, the company unveiled a prototype fuel cell laptop alleged to possess up to 10 hours' battery life. However, it's encumbered by a bulky dongle containing the new power apparatus designed to sit behind the PC. The company maintains it will

"commercialise the technology" during 2004 but is yet to announce the specifications of the laptop or a firm release date.

NEC is another player, also with a yet-to-be specified laptop. Like Toshiba, NEC will place its fuel cell in a dongle, situated beneath the laptop. NEC expects its apparatus to weigh 900g including fuel, making it heavier than many batteries, even though the company plans just five hours of battery life for the machine's 2004 debut. The company already has a new generation of fuel cells using carbon nanotubes and speculates that these may have battery lives of several days.

Fuel cells are also finding their way into PDAs, mobile phones and digital cameras, with Hitachi announcing late in 2003 that it has teamed with a cigarette lighter manufacturer to create a fuel cell the size of an AA battery.

demands of richly-featured phones threaten to blow out their size. Consumers have long spoken with their wallets in favour of smaller phones, another factor in fuel cells' favour.

Yet the key to widespread acceptance of cells may not be the performance of the technology but its usability. While NEC, Toshiba and Hitachi all agree on the need for methanol cartridges, a standard form factor is yet to be agreed upon, and consumers are unlikely to want expensive proprietary consumables. The three companies have joined with 13 others in the Japan Electrical Manufacturers' Association to relieve this problem by defining a cartridge standard, but a release date is uncertain.

In 2003, battery giant Duracell invested in a US fuel cell company with the stated aim of selling methanol cartridges alongside its conventional products by 2005.

Small phials of methanol could erase the battery life problems of laptop computers forever

The company plans to release the fuel cell and a compatible PDA in 2005, but product details are again hazy.

Toshiba has a PDA solution in the works, in the form of a fuel cell designed to recharge batteries rather than replace them. The size of a small flip phone, Toshiba believes consumers will be so impressed by the compact size of its fuel cell that they'll throw one into their bags and recharge their electronic devices whenever it becomes necessary. They could even plug the fuel cell in for long periods to replace spent batteries. Capable of producing 1W — laptops need at least 12W — of power for up to 20 hours and refillable with its methanol fuel, the gadget is expected to reach the market in 2005.

Can these gadgets find success in competition with the $6 billion global market for conventional batteries? Gartner Analyst Robin Simpson believes there's certainly demand for long-life power sources. "Battery life doesn't keep up with the functionality of modern devices. Already, the typical pocket PC's battery can't keep up with the demands users place on them," he says. The frustrating user experience this produces will see some take up fuel cell technology enthusiastically.

Fuel cells are also attractive because they could help manufacturers address another issue: the growing size of portable electronics. Batteries currently occupy 20% of a mobile phone's volume and the increased power

The idea of a standard cartridge approach is also popular with the Mobile PC Extended Battery Life Working Group (EBLWG), convened by Intel in late 2002 and populated by HP, Acer, Fujitsu, Toshiba, NEC, Asus, LG, Microsoft, IBM, Dell and others. EBLWG hopes to give impetus to fuel cells by developing specifications for mobile PC fuel containers it calls "universal fuel cartridges."

Reaching the goal of universal cartridges is highly achievable, as are the other fuel cell scenarios proposed by manufacturers, because the technology has been known for over 150 years, is widely used and well-understood. Space shuttles use fuel cells, as did the lead car in the women's marathon at the Sydney Olympics. Perth is currently trialling a fleet of three fuel cell buses.

Fuel cells have come to prominence in recent years after Canadian company Ballard developed a new type of cell — the Proton Exchange Mechanism — which improves power output and increases reliability while using pure hydrogen as a fuel. Ballard also manufactures fuel cells on a large scale, taking them from an industrial curiosity to a commodity.

But the big boost for fuel cell research and development has come from the need to find alternative energy sources, given the unwelcome and increasingly unsustainable carbon dioxide emissions created by fossil fuels, a finite resource. Even the USA is behind fuel cells — a US$1 billion research program aims

Your notebook's new power source

While fuel cells generate electricity without creating pollution as a by-product, making hydrogen to power the fuel cells is not a clean process.

Fortunately, it's not a difficult process. Apply electricity to water and the hydrogen and oxygen separate quickly and easily in a process called electrolysis. But with the vast majority of electricity generated by greenhouse gas-producing, coal-fired power stations, fuel cells just shift the pollution problem to a central location instead of doing away with it altogether. And while there are cleaner ways of making hydrogen, the "greenest" method currently used involves heating and compressing natural gas; they still require conventionally produced electricity.

Australian scientists, however, are working on some completely clean answers. Janusz Novotny and Chris Sorrell of the Centre for Materials Research in Energy Conversion at the University of New South Wales are working on ways to produce hydrogen using solar energy. Their approach uses a substance which produces electricity when exposed to light and immersed in water, then electrolyses the water to produce hydrogen.

Brisbane-based researcher Ben Hankamer has another approach. He's genetically modifying bacteria which produce hydrogen in the hope they'll produce useful quantities.

But the best candidates of all are the wind turbines or other clean methods of producing electricity gaining local currency following Tasmania's recent installation of commercial wind farms and the Australian Antarctic Division's installation of wind turbines at Mawson base.

Using clean electricity to manufacture hydrogen, which is then used in cars and other portable applications, offers the most likely route to addressing pollution and global warming.

See next month's *APC* for our annual Mobility Special with a comprehensive roundup of the latest notebooks and accessories.

to create a fuel-cell powered "Freedom Car" to reduce North America's dependence on foreign energy sources.

This momentum made it all but inevitable that the electronics industry would show renewed interest in fuel cells. Yet before they change the way we power up, there are several obstacles to be overcome.

All of the manufacturers discussed in this article plan to use methanol as fuel, since the most common and powerful fuel cell power source — hydrogen — is usually stored as a compressed gas. Airlines chastened by post-September 11 security considerations are likely to baulk at laptop-toting travellers carrying compressed gas in their cabins.

In its pure form, methanol may kill or blind you if you drink it and burns on contact. But even with its reduced power output, it's a good compromise because once diluted with water it becomes airline-friendly at the cost of lower power output. At least it's cheap and plentiful: Methanex, the world's largest methanol producer, sold it for around 25 cents per litre at the time of writing and operates two plants in New Zealand which together produce 2.4 million tonnes of the stuff each year.

But shrinking methanol fuel cells to a size at which they make dongle-free laptops portable for days at a time is another challenge. "When you design a small fuel cell you don't want too much plumbing and bulky support systems surrounding it," says Dr Badwal, as this increases the size of the fuel cell and reduces portability. Ensuring that airflow is adequate and waste water can be drained away without upsetting other components is another challenge his team is working to overcome.

The CSIRO has already produced some promising results, with micro fuel cells achieving 100mW of power for each square centimetre of catalyst. Badwal recognises that a fuel cell the size of a current laptop battery is the ultimate goal, but he says it's too early to predict when the CSIRO will be able to deliver — a position other manufacturers share.

Even if the right size can be achieved, temperature will be a problem. Methanol fuel cells generate heat of 50 to 100˚C, which partly explains the need for dongles and terrifies laptop designers already creating elaborate heatsinks to cope with modern CPUs.

Another worry is the fact that the power output of fuel cells declines over time, to the point where a replacement catalyst is required. Badwal's team at CSIRO has tested fuel cell units with catalysts that last over 1,500 hours, but whether consumers are willing to pay for fuel cartridges, then pay again for periodic parts refits remains to be seen.

These weaknesses in fuel cell technology also leave the door open for different portable power technologies. In 1999, Compaq patented a system to capture power from keystrokes on a laptop to recharge its batteries, an idea that has led IBM and others to investigate how human motion like walking, talking or breathing could be harnessed to generate power. Gartner has identified solar power as another technology with long-term potential. It also sees a future for miniaturised electricity generators which have already been built at MIT where "... a micro turbine prototype spinning at more than 1.4 million revolutions per minute. The device is only 10mm in diameter and 3mm thick (without fuel tank), and generates 10 to 20W per hour from 10g of fuel."

For the next few years, however, fuel cells and methanol cartridges seem to be the technology most likely to succeed, as many companies around the world are racing to overcome the limitations of the technology. Gartner predicts their work will bear fruit around 2006, when fuel cell-powered electronic devices will hit the streets. But it won't be until well beyond 2010 that fuel cells will become ubiquitous and mature, the analyst firm says.

By then, perhaps the miniaturisation issues will have been resolved. However, until the many issues facing fuel cells are overcome it seems likely these devices will deliver greater battery life at the expense of size and weight, a compromise that hardly constitutes a revolution. BITE

These devices will deliver greater battery life at the expense of size and weight. . . hardly a revolutionary compromise

Power packed: *fuel cells are set to revolutionise the electronics industry.*

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The next step in gaming

Michael Ephraim

Retailers need to sit up and take notice of the changes happening in the games console industry.

The maturing of the games console into a multi-format entertainment device has brought about massive growth. Working as the president of the Interactive Entertainment Association of Australia (IEAA) and as former president of the Australian Video Software Association, the key focus was to raise awareness of the games console as a distribution device for digital media. However, it's taken many years of campaigning to bring attention to the issues and opportunities facing the Australian video game market.

The interactive entertainment market is expanding at a rapid rate and it's now clear to everyone that games consoles and the gaming category are playing a major role in shaping the future of home entertainment and home networking. For instance, both the PlayStation2 and Xbox offer games with voice recognition, motion capture and voice-over IP (VoIP), not to mention surround sound and DVD capabilities.

The launch of the Network Adaptor and EyeToy USB camera products for the PlayStation2 have opened people's minds to the infinite opportunities that lie ahead for entertainment in the home through what has traditionally been a kids' gaming device.

The latest games consoles are broadband-enabled, support multiple peripherals and can be used to play games, watch movies or listen to music. Future products will introduce a host of new capabilities and product uptake will be much more dependant on retailers informing and demonstrating these features to consumers. We're talking about products that will form the hub of home entertainment; as yet, many retail stores are just not set up to sell these products.

It's evident that the retail outlets where you currently buy games consoles may not be the same place you'll find future gaming products, which have come a long way from mere games machines such as the old Atari, Sega Dreamcast and Super Nintendo consoles. Some companies such as Telstra and various other smaller electronics outlets have taken notice of the shift and capitalised on the growth of networked and convergent products — if you're selling someone a broadband subscription, it makes sense to also recommend a broadband-enabled games console.

Retailers must move away from the "low price" mentality and deliver, first of all, a physical environment that can accommodate the products that will make up the home entertainment networking category. After that, there's still a lot required to expand product knowledge, customer service and customer support. With a few exceptions, I don't feel Australian retailers are being proactive in their approach to the changing landscape. Retailers with this mentality will be left flat-footed as high demand home technology products are rolled out.

Michael Ephraim is the outgoing president of the Interactive Entertainment Association of Australia, and managing director of Sony Computer Entertainment (SCE) Australia/New Zealand.

The World Wide Web is not enough

David Emberton

Web standards. They're big, dumb, and they don't work. Yet, they persist. Why?

Communist radicals got a bad rap in the 20th century because they wanted to take over the world and brainwash everybody. More efficient, they said. More humane, they claimed. A better way to run things, so they thought.

These days, the rebel youth aren't so busy admiring Marx as they are giving each other tutorials on how to use XHTML Strict. Bravely battling JavaScript menus and eradicating layout tables, admonishing us to "please think of the children" and design our pages so they're compatible with the handhelds of next century. Same conformist thinking, same lousy outcome.

According to the Web Standards Project, the world needs this stuff because it's simpler, more affordable and available to all. Oh really? Could it be that they're just ideas cooked up by a bunch of overpaid intellectuals? Whatever happened to trial by market, or supply and demand? Painful questions, perhaps, but let's face it — when innovation has slowed to the point that tabbed browsing is a headline feature, it's time to put down that Jonestown Sling.

Cascading Style Sheets (CSS) are a classic example of the madness. Reared in a cubicle somewhere, they're pitched as the pinnacle of document styling. CSS are public, free and future-proof. Sounds great until you realise that: a) you need a degree to understand them; b) Microsoft doesn't care about them; and c) they suck. What's more, CSS have been promoted as "the future" since the mid-90s, and by now the only thing keeping them alive is a steady stream of guilt and the occasional Movable Type installation.

While XHTML and CSS have been at least moderately successful, many other W3C recommendations have failed to gain any traction. It's these lesser creations like SMIL, MathML and SVG that really demonstrate the flaws in the group-think process. Not to mention the 20 other projects that no-one even discusses.

However, this doesn't seem to discourage the advocates. The problem of saving the world from browser competition has mostly disappeared, but no matter. Standards cronies have now latched on to the disabled — the starving African children of high technology — for leverage. Spend time reading A List Apart, (**www.alistapart.com**) and you'll soon get the impression that accessibility is bigger than cancer, and we're all about to go blind and lose our mouse-bearing limbs. The solution? Web standards!

I too was once seduced by the dream of an XML utopia, complete with vision-impaired people frolicking in the meadows. I too spent nights deciphering the box model, and polishing my shrine to Tim Berners-Lee.

But now I'm fed up. I want the browser wars back. I want to use Flash and PDF (you know, technologies that work) without being accused of bourgeois elitism. Is it really so important to make our Web sites phone-compatible? PDA-compatible? Safe for the flat-footed? No. All that matters is the desire to communicate, and the ability to steal any good thing that gets invented. Like Sputnik.

David Emberton is a professional Web developer, author of Flash 4 Magic and Flash 5 Magic, and regular APC contributor. Contact him at ***david@emberton.com****.*

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I have had a similar experience to that of Alexander Yap with bundled software (*APC* December 2003, page 34). My business pays a subscription fee to Microsoft for software licences including XP. So when my IBM laptop came bundled with XP, I wanted to return it.

IBM told me they are required to ship all laptops with Windows per its agreement with Microsoft. I suspect this is how the vendors get such good pricing on the OEM software, but as a trade-off they are forced into only pushing the Microsoft-designated OS.

Mark Cavanough
Moorebank, NSW

MATRIXULATION

I enjoyed reading William Maher's "101 Classic Computing Moments" (*APC* February, page 114), but baulked at number 95 "Geeks Take Hollywood".

His description of *The Matrix* as having "philosophical mumbo-jumbo" would indicate a lack of insight. The fact that all of our sensory inputs are no more than electrical impulses that are detected then decoded by our brain is common knowledge.

The idea that all reality as we perceive it is no more than electrical impulses is quite an intriguing concept for people to contemplate. Further, the implication that superhuman feats are possible for those who are "from outside the Matrix" and who control forces that are not part of this world may go some way to explain the various so-called miracles attributed to some of the world's historical religious figures.

Daniel Forrest
Busselton, WA

News just in: Matrix short-circuited after Neo attempts walking on water – Ed.

OUTBACK ACCESS — TRADER'S PERSPECTIVE

I can see the point of Bruce and Joy Stewart's letter (*APC* February, page 29) but there is another side to the story. Three years ago I set up a couple of computers to give Internet access for the travelling public who come through here on their way into the outback. I also put in an extra telephone line which I planned on using for an occasional fax also to allow access for the travellers with their portables. Naturally, Telstra charges me a monthly rental for this line so I would have to get some payment from the users who wished to connect. I cancelled the line after three months, as almost no-one using it thought they should have to pay to help cover the monthly rental.

My fax is quite capable of getting its two or three calls per day while connected to the phone line. I cannot use the phone line for the Internet as I receive many calls each day and also need it free for emergencies. My other line that I use for the Internet is tied up all day as I have a continuous connection on it.

With an average of about 10 users per week, the Internet connection is not paying for itself anyway, but I have continued as it seems that those who use it do not mind paying something for its use. It seems those rich enough to have a portable are the only ones complaining.

Wayne Schuttloffel
Quorn, SA

DON'T MENTION THE WAR

Regarding Richard Pieczul's question (*APC* February, page 30) about the Power Mac "Why should it be the most expensive when overall, it lost two out of three benchmarks?". Answer: because the SPEC benchmark for the 2GHz Power Mac G5 by *APC* was for a single processor when the default configuration for a 2GHz G5 is dual processors. *APC* took the SPEC Integer and Floating Point tests for the G5 straight from Apple's own test done with a cross-platform, open standard, open source compiler (GCC). Intel's and AMD's compilers were proprietary and selected for their performance of individual chipsets.

Why should I believe independent analyst reports, when the analysts are owned by Microsoft, Intel or Nvidia?

I wish for the day when I don't have to read between the lines of benchmarks that are done

Letter of the month

I was astounded to read in your broadband alternatives feature (*APC* February, page 18) that Mawson Lakes has very poor wired broadband access.

Mawson Lakes is a pleasant community that sits between the railway line and the Main North Road. It does lie underneath the Parafield Airport flight path, above old sheep pits, and sits downwind from the Torrens Island Power Plant. Nevertheless, the place was promoted as a technological nirvana. They even used encumbrances (covenants) to require that all houses be fully wired for data. Pity that they are not wired to data.

It's worrying because Mawson Lakes is the direct descendant of the Multifunctionpolis. Remember the MFP? Australia's tilt at the future back in the '80s? Well, it lived on, resulting in Mawson Lakes. A more modest vision, but still one that would point to the future of technologically appointed residential developments. Clearly this future will not be all that connected, and as a result it will not be all that clever. At least not in this country.

Timothy Surendonk
Quakers Hill, NSW

Ah, memories of the Multifunctionpolis brought a nostalgic tear to many an APC *staffer's eye. Who'd have thought that those idealistic visions of our technological future would drown under a welter of fibre optic RIMs, ACCC investigations and Telecommunications Ombudsman complaints?*

For his stroll down memory lane, Timothy wins *APC*'s letter of the month prize, Logitech's Cordless MX Duo. Valued at $229.95, the wireless desktop is at least one hardware dream that became reality.

with special drivers, compilers and half-truths, but alas it is never going to happen.

Ian McDougall
Brisbane, Qld

USER, TEACH THYSELF

Seldom have I read a bigger load of drivel as that written by Gordon Drennan (*APC* February, page 30). He blames the computer industry for making the process of acquiring a computer user-unfriendly. Yes Mr Drennan, it must be all their fault. It is not the fault of the lady who bought that laptop and that she was clueless about computers. It must be Boeing's fault she doesn't know how to fly an aeroplane.

The people mostly to blame are those who acquire a piece of technical equipment and expect that the equipment does everything for them without any effort on their part to learn how to use it. When people buy cars, they first have to learn how to drive them properly and also acquire comprehensive knowledge of the rules associated with driving. When people buy computers, they first have to learn to drive them properly and acquire comprehensive knowledge of the software installed and the services connected to the computer, such as the Internet and its problems and pitfalls.

Mr Drennan, save your sympathies for the computer consultants who have to deal with people such as your friend, who seems to want to blame everybody but herself for her computer problems.

Ziggy Malter
Dural, NSW

JUST THE FACTS, MAN

Dan Warne should stick to reporting the facts. The Telstra "amazing backflip" (*APC*, February, page 22) is beneficial for broadband in Australia. It offers increased applications for broadband, and a "Your bill will only be $X no matter how much you use the connection". Something that Telstra users and the Internet public have been crying out for.

Mr Warne turns the Telstra pricing restructure into a negative by using comments such as "They're good for 10GB of usage at full speed; after that usage is at a substantially hobbled rate of 64Kbit/s." He fails to mention that users "may" be restricted — many at Whirlpool.net.au [report] still going full speed after 20GB of usage. Even then 64Kbits/s is better than Optus' 28Kbits/s.

Later there are comments like "then it introduces plans which serve no purpose other than to entrap consumers into running up outrageously high bills." Entrap customers? Let's say a user does inadvertently sign up to a pay per megabyte plan. They can easily change the next month to the unlimited plan which hardly "entraps" the customer.

Andrew Tomlins
Carina, Qld

Dan Warne responds:

BigPond's 10GB "unlimited" plans are certainly a welcome change from the dark days of the "dialup at broadband speeds" 3GB cap. But Telstra's ads place great emphasis on the claim of "unlimited downloads", which most consumers won't realise means reduced speeds may result after a fixed download limit.

Andrew, you also say that customers on Telstra's pay per MB plans can easily move to one of Telstra's unlimited plans. But surely you don't support the concept of getting people in on cheap prices and then upselling them to a more expensive plan? The fact that Telstra has dropped these plans altogether just two months after introducing them speaks volumes about the reaction it got from customers.

BILLION [OFF THE] AIR?

I first discovered the Billion 7500G ADSL modem/router in mid-December last year. It was interesting to note in your February edition the glowing review of this product, awarding 4.5 stars, and the *APC* Editor's Choice February 2004 for a Wireless ADSL modem/router. But when are the consumers going to see this product?

As I understand from Billion sales, this product has failed its emissions testing for the third month in a row. Get it together, Billion!

Tim Rippon
Geelong West, Vic

A STEP TOO FAR

In direct reference to "Pirate Pete's" letter (*APC* February, page 29), I applaud him for having the guts to tow himself *and* his son down to the police station. How many of us would do that? I honestly have nightmares about some large corporation knocking on my door and saying, "Hey, the product key you used to install your software was used by 233 other people!".

Agenda: Your place to vent

I am constantly amazed by what the IT industry gets away with in terms of marketing and selling its wares. Processors are advertised at certain speeds (2.6GHz, for example), but in reality only operate at a much lesser speed. Hard disks claim to have a certain capacities and then after you boot the thing up, your System Properties indicates something much less. And what about when [a broadband ISP] advertises a speed of 512Kbit/s and you commit to a plan only to find that your connection never gets anywhere near that speed. This smacks of nothing less than deceptive advertising and I'm left wondering how can we allow it to go on?

Mark Sullivan
Southbank, Vic

What is this world coming to? People slave day and night over their PCs to bring us quality software, and some bum in New York spends five minutes practically robbing that person of their entire livelihood. What I don't agree with is Macromedia and their "Macromedia Licensing.exe", a program that is effectively spyware. So everybody, please attack your Add/Remove programs dialogue and help those poor software writers.

Alexander Sakker
Wahroonga, NSW

THINK BEFORE YOU DELETE

Regarding Darrin Smith's letter (*APC* March 2004, page 34). Spam is definitely rendering email much less reliable.

Some colleagues and I recently set up a new Web site. During its creation, interested people could leave their name and email address to be notified when the site went live. The email I sent to notify these people doesn't seem to have had much effect. One recipient (of 60) wrote back saying that she initially deleted the message thinking it was spam.

Two thirds of the list don't seem to have acted on the message. I have no way of knowing if they received the message or if it was killed by a spam filter between here and there.

There's no way to know how many real messages I delete without noticing. What use is an email address if I don't know if you'll read what I send to it?

Ralph Reilly
Melbourne, Vic

PULL THE OTHER ONE, TELSTRA

[In the process of moving house], I rang Telstra to arrange transfer of my telephone and broadband accounts to my new address. I took the opportunity to ask Telstra if I could use a "Faxstream Duet" fax machine on the same line as broadband. The reply I got was, "Of course you can, because broadband uses the outside of the cable."

Hmmm. That opens up a whole new world of data connection infrastructure possibilities.

Jonathon Walsh
Mildura, Vic

DELUXE MICE, NO WAY

You guys only talk Microsoft and Logitech. You recommend a Logitech cord mouse for $89. Are you crazy? I have a Fellowes mouse that's just as good that cost about $30 dollars from Woolies.

You talk wireless nonstop, but these mice are way too bulky because of the NiCad batteries inside them, and they cause wrist RSI. You guys are like whores of the rock and roll industry who only promote big brands.

William French
via email

APC's Technical Editor Matthew Overington responds:

It's true that price will be king for some buyers, but others are after the ultimate in performance and ergonomics. The fact is that many people — myself included — prefer a heavier mouse for the sake of control. Also, you're by no means limited to NiCad batteries in cordless units. In fact, lithium ion rechargeables are not only lighter, but also have the added benefit of lasting longer.

CENTRINO ON THE DESKTOP?

Though the retail price of Toshiba's top notebooks is beyond my reach, I can see that some fine design and precision engineering has gone into [Toshiba's] Portégé R100. It makes full use of new technologies such as the slim Lithium Polymer battery, excellent performance of the new Intel Centrino ultra-low-voltage Pentium Mobile CPU and chipset combination, and the bright and clear Polymer Silicon LCD screen.

Will we see a new market develop to use this cool-running Centrino combination in mini desktop PCs, as prices for these matched mobile CPUs and motherboard/chipset combos drop?

John McKenzie
Timaru, NZ

Matthew Overington responds:

We think the biggest reason for Intel not pushing the Pentium M processor into the desktop space is that it risks undermining the existing Pentium 4 line. The quickest Pentium M processor only clocks at 1.7GHz, and even though its performance is roughly on par with Pentium 4 units running at 1.5 — 1.8 times the clock speed, it simply doesn't look as good in an advertisement. Don't rule out Pentium M-powered Blade servers, though.

VIRUS UPDATES CAUSING HELL

I have found a new virus and intend to warn everybody. It is an insidious variety operating under the guise of an antivirus application. I call it McAfee VirusScan.

I didn't really have any problems until I defragged my hard drive. Then ActiveShield, the part of ViruScan that protects your computer in "real time", disappeared from my task bar. No problem I thought, I have a legitimate product and I'll just ask for support.

The first advice from "support" was to un-install then re-install VirusScan. I was told to go to the Control Panel and choose the "Add or Remove programs" facility. Sounds simple… but the trouble is that "Add or Remove programs" removes everything but any McAfee product. Defragging the hard drive appeared to have confused old "Add or Remove" and it couldn't find McAfee files to remove them.

In the end, a special waiver was made and I was emailed a list of instructions on how to find all of the registry entries for McAfee and manually delete them.

I finally got the last files named McAfee, VirusScan or ActiveShield, then I re-installed McAfee VirusScan. Months went by and I decided to defrag again. Again, the ActiveShield icon had disappeared from my task bar but VirusScan and McAfee were still installed.

When I do hunt McAfee and its virus-like files out of my system I intend to replace it with the free NOD32 anti-virus product from one of the PC magazine cover CDs. I will then buy the magazine every month and update the program from the new CD. That has got to be faster and more secure than the hours spent connected and unprotected.

Maurice McGahey
via email

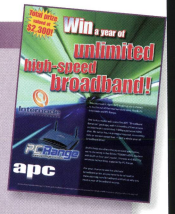
MODEM MIRACLE

I purchased a Billion broadband modem/router from MegaPC via its Web site (**www.megapc.com.au**) and was astounded by the company's performance. To my utter astonishment, my order was processed and delivered to me within four hours!

When I placed the order I was, in all honesty, expecting to get the item a few days after my transaction. I have never had such a turnaround in a Web-based transaction. It is obvious that MegaPC understands that excellent customer service helps build great customer relations.

Colin Linke
Highett, Vic

Prize Pit



The lucky winner of our February Broadband giveaway is David Frahn of Murray Bridge, SA.

David has won 12 months' of unlimited broadband with Internode, plus a Billion 7500WG ADSL modem with built-in four-port router, firewall and 802.11g wireless networking, courtesy of PC Range, at a total value of $2,300.

Error Log

The review of the Medion MD6100 in *APC* March (page 54) incorrectly suggests that the machine is available for purchase from Aldi supermarkets. While this is true of some other Medion hardware, Far Edge Technology (**www.faredge.com.au**, (02) 9955 3640) is handling the MD6100. Note that a 1.6GHz Centrino-based unit, the Medion MD41057, will be on sale in Aldi stores at the end of March.

Have your say

Add to these discussion threads or email your views to **epinions@apcmag.com**.

All correspondence becomes the property of *APC* and is subject to editing. Letters sent to epinions@apcmag.com must include the writer's full name, suburb and phone number, to be considered for print publication and in the running for Letter of the Month prizes. Phone details will not be published.

When you break the big stories, you ruffle a few feathers.

The Bulletin
Setting Australia's Agenda

Nibbles

Portable Prescott

Notebook vendors are rushing to be the first to ship desknotes with the latest chips — as was the case with the Athlon 64 and Intel's P4 Extreme Edition. Now, Dell (**www.dell.com.au**) is set to produce Prescott luggables, targeting the same "practical workhorse" user segment.

While we don't have detailed specs just yet for the upcoming 9100 series, it should replace the existing Northwood B-based Inspiron 5100 desknote range. Rumours (based on what Dell's notebook manufacturer Quanta is currently building) indicate that it will feature a 17in wide-aspect screen and an ATI Mobility Radeon 9700 GPU.

But regardless of the specs it ships with, don't expect it to last too long on the road. Intel's 90nm chip is hot, churning out up to 103W of power.

Expect to see a Prescott-based system designed to replace the higher-end models in the cheaper 1100 series soon.

Hertz so good

Overclocking was in its infancy back in the Pentium III days. But if you wanted to squeeze your CPU till it hertzed, Alpha's range of CPU heat sinks and fans were more than adequate for just about all cooling needs.

The Japanese manufacturer has recently announced two new cooling solutions for AMD's Athlon 64 range of processors. The U81C is a passive heat sink designed predominantly for 2U Opteron or FX-51 servers, but will work on any AMD64 platform.

Most cooling enthusiasts will be after one of the three versions of the PAL8150. The PAL8150-M81 features a standard 4000rpm fan, which is fairly quiet at 40dB (in respect to ambient noise volume). The M82 sports a lower-profile blower which spins at half the speed of the standard unit. The interesting-looking copper heat sink has a black, anodised finish and is also available separately if you'd prefer to use your own fan.

These components are imported by Brisbane's CoolPC (**www.coolpc.com.au**) and pricing starts from around $80. All three models have backing plates available as optional extras should your motherboard not ship with one.

Cool readings

The inventors of the USB interface could never have imagined the sheer scope and range of gadgets that we're seeing today. The latest one comes from Microgram Computers (**www.mgram.com.au**) and is a splash-proof USB temperature sensor.

Continued under gatefold

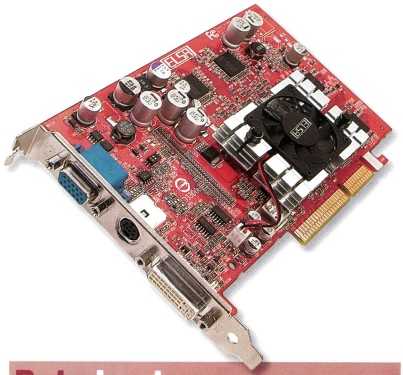
The pursuit of speediness

Another player has jumped into the Aussie video card market, with Altech announcing its distribution of the ELSA (**www.elsa.com.tw**) range of display products.

The company has carved out a reputation across Asia as a supplier of high-performance video cards, and many of their top products employ ball-grid Array memory to improve performance. Based in Taiwan, this is the first time the company has appointed a single distributor down-under. The range that's now shipping consists of both Nvidia and ATI cards in addition to Wi-Fi networking and storage solutions.

The ELSA Web site promises that these cards aid in "luring your desire of pursuing speedy", which we can only assume to be a good thing.

Expect detailed reviews of the ELSA Gladiac FX935SE and Falcox 960XT cards in the May issue of *APC*, but in the meantime, check out **www.altech.com.au** for more information.



Beta beat

Mozilla's racy browser application, Firebird, has recently undergone a name change and future developments will be available under the Firefox moniker. Version 0.8 had just been posted to the Mozilla.org site at time of writing. Some of the other changes include a download manager which supports multiple downloads and improved handling for bookmarks.

Mozilla has also posted version 0.5 of its Thunderbird Enterprise-grade email application onto its site. The latest Thunderbird release includes a number of handy additions including Palm device addressbook support, IMAP improvements, support for SSPI NTLM for SMTP and POP3 password authentication, and tweaked LDAP support.

Of course, Mozilla has made all source code and documentation available under the open source Mozilla Public License. For more information, visit **www.mozilla.org**.

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A sound mentor

Audiophiles who've lamented the need to experience surround sound with six physical speakers can now get the same effect with a pair of headphones from Mentor. Six separate chambers in each earpiece create a multi-directional effect, duping the listener into believing the sound is coming from a particular direction.

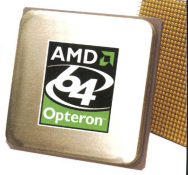
There are several models that will appeal to PC and Mac users, starting from $219 for the Mentor RCH125 Deluxe extending to the $259 RCH100 Professional, which comes with its own AC97 decoder.

Game console players need not despair — a set which plugs into DVD players, digital TVs, Xbox and PS2 is availablefor $299. See **www.conexus.com.au**.

*nix

A bug-free version 1.2 of KnoppiXMame has hit download m
world. This tweak to KnoppiX, a powerful bootable Linux dis
to boot to a Linux environment with MAME (**www.mame.ne**
and operational. From here they can load and play older arca
from just about any file system (even NTFS, although this fun
experimental). The 150MB ISO file is a relatively zippy downl
connection, but would take approximately 15 hours over dia
over previous versions is the ability to remaster MAME ROM
the project can be found at **http://sourceforge.net/projec**
but if you want to download the ISO directly, try **http://aler**
.net/sourceforge/knoppixmame/KnoppiXMAME-1.2.1.is

Opteron and on



Never content to rest on its laurels, chip innovator AMD has announced a range of low-voltage processors for servers and workstations. The HE (55W) and EE (30W) Opteron processors shipped in late March, and are aimed at Blade servers, small servers and desktop workstations.

The original Opteron processor impressed *APC* last year and the market agreed — they're already outselling Intel's Itanium units in the server space. The eight-way Opteron processors are numbered 846 HE and 840 EE respectively and are priced at US$1,514 in 1,000-unit quantities. The two-way versions sport the 246 HE and 240 EE tags and go for US$851 in 1,000-unit quantities. Single processor machines can spec the 146 HE and 140 EE, which are priced at US$733 in 1,000-unit quantities.

The release of a low-power server chip capable of executing 32- and 64-bit code natively is a key step for AMD, demonstrating the company's willingness to take Intel on in all areas of the server market. On the flipside, Intel has hurriedly announced that it will offer a 32/64-bit Xeon processor by the end of 2004 in an attempt to maintain customer loyalty.

Pocket magic

The countdown is on until Media Centre PCs using Microsoft's new Windows Media Center Edition start hitting the market from major brands like HP. If you can't wait that long and don't want to fork out for a brand new system, the Snazio Pocket PVR is ideal.

The product combines the basic elements needed to turn your PC into a TV recorder, with built-in mini TV tuner and 480Mbit/s high speed USB 2.0 interface. You also get bundled MPEG-1/MPEG-2 encoding software for recording video for editing on your hard drive. It's all housed in a small USB 2.0 device handy for plugging in when you're on the road with a notebook. The Pocket PVR is available from Bytezone (**www.bytezone.com.au**) for $220.

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o.

Featuring a typical sensitivity of 0.2 degrees Celsius, detection range from -20 to 80 degrees and support for Linux and Windows platforms, the temperature sensor should be able to handle most applications. However, you'll want to be using it a lot considering it comes with a $200 price tag.

While the unit doesn't require drivers to operate, it's bundled with a CD including control software, an API and documentation. The control software allows the sensor to trigger up to 256 different actions — a handy feature, especially for overclockers who are worried about the temperature of their rig.

The software also allows data to be logged over a network infrastructure. System admins can easily monitor the temperatures in server rooms and comms racks. Getting the current temperature displayed on your Web cam images is also possible, along with many other applications after a bit of tinkering with the API.

Full frontal

Due to the lack of front-mounted ports, strained lower backs, twisted necks, stubbed fingers and general frustration usually ensue whenever plugging a USB device into a PC.

There are several workarounds to bring the ports you need to the front and the latest comes in the form of Gigabyte's Expand Box (**www.gigabyte.com.tw**). The $14.99 device fits into any vacant 5.25in drive bay and allows you to connect directly to the headers on the motherboard. It includes two USB 2.0 ports, two FireWire ports, and audio line-in and line-out ports in a nice, neat solution. Now to book that chiropractor...

Tower of power

ThermalTake enjoys an almost cult-status amongst system builders for its feature-laden, quality cases. The latest in its Xaser range is the XaserV Damier series of towers. Available in steel or aluminium in a variety of colours, all sport the distinctive checkerboard flash on the front panel.

Hard case: *ThermalTake's XaserV Damier's are a pleasure to work with.*

Measuring 490 x 250 x 580mm the cases feature front panel LEDs, blue LED cooling fans, a LCD readout monitoring temperature and fan speeds, and rheostats to adjust the speed.

They're also a joy to work with — high-quality storage cages, retaining brackets and construction all add to the experience. The kit includes five fans, security for front and side entry, and support for top-mounted audio, USB and a FireWire port. The XaserV Damiers aren't cheap (starting at $279; $299 with windowed side panels) but you'll be the envy of those in the know. Go to **www.anyware.com.au** for more information.

Record label

The joy of the mix tape lives on with the low cost of CD burning, but what about the cover art and album titling? You can try those printable stick-on CD covers, but that can be expensive with the cost of replacement ink cartridges, not to mention fiddly.

Disc deco: *label your burnt discs with style.*

Region4 (**www.regionfour.com.au**) has spotted a niche for a low-cost CD printer that fits somewhere between those multi-disc monstrosities used for bulk burning frenzies and the humble black texta. Designed for single-colour print jobs, we can't see why it wouldn't make a handy labelling system for home-made CD compilations.

The Evocept Spin printer can handle CDs and DVDs and uses a thermal transfer with a 200dpi resolution. The unit connects to your PC with a USB 1.1 connection. First design your disc onscreen using supplied design software, then throw the disc in the printer and click print. The unit costs $199, and Region4 claims the machine will print around 50 discs for $20 in consumable costs.

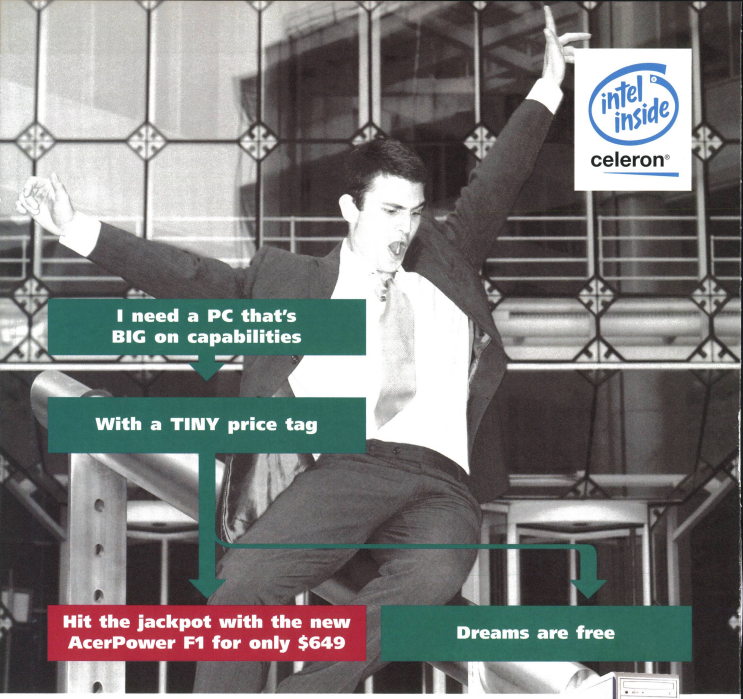
Oh, and those discs should only contain legally downloaded songs, but you already knew that.

Snail mail to the rescue

With a vast number of people still on dialup, it's becoming increasingly difficult for them to download the various updates and patches needed to keep a PC virus-free. The solution? Order a CD in the mail.

Microsoft has kindly offered to produce an update CD combining all critical updates for versions of Windows released up to October 2003. It's available for Windows XP, Me, 2000, 98 and 98SE, and it includes bonus antivirus and firewall trial software. Best of all, it's free.

However, any virus exploits needing patching after October will require more updates. To order the CD, visit **www.microsoft.com.au/australia/security**. Remember, you'll need to allow 2–4 weeks for delivery.



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A PC that does everything your business needs for only $649.

Sick of trying to run software on a computer that's not up to the job? Then here's your opportunity to upgrade to a reliable brand name PC for a pittance. The AcerPower F1 gives you all the power and speed you need in a base-level PC at a very affordable price. You can even customise it to your requirements. It's the perfect foundation for a truly 'personal' PC. Order now and it's yours for just $649, including a 1-year, on-site warranty. That's unbelievably good value.

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256MB PC-2700 DDR SDRAM
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Integrated AC655 audio
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CD-RW
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Integrated 10/100M LAN – Broadband Internet ready
1-year on-site warranty
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40GB 7200rpm hard disk drive
DVD Writer Super Multi Drive
Integrated AC655 audio
Integrated 10/100M LAN – Broadband Internet ready
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TravelMate 371TCi

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Intel® Centrino™ Mobile Technology
Intel® Pentium® M Processor 1.4GHz
Intel® 855GM Chipset, Intel® PRO/Wireless Connection 802.11b, 12.1" active colour screen,
256MB DDR SDRAM, 40GB EIDE hard disk drive,
External FireWire DVD + CD-RW combo drive,
Internal 56K modem + broadband-ready 10/100 LAN
2 Hour Commitment Warranty Express Service**
Upgrade to Microsoft® Windows® XP Professional for $200 RRP inc GST†

$2,799 RRP inc GST, $23.00 per week* e-code: TM3700

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Intel® Pentium® 4 Processor with HT Technology 3.06GHz
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Large bright 17" active colour screen
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Microsoft® Windows® XP Tablet PC Edition
Intel® Centrino™ Mobile Technology, Intel® Pentium® M Processor 1.4GHz, Intel® 855GME Chipset
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14.1" active colour convertible screen, 512MB
PC-333 DDR SDRAM, 60GB EIDE hard disk drive
8x DVD + 24x 10x 8x CD-RW combo
Internal 56K modem + broadband-ready 10/100/1000 LAN, 4-in-1 multi-memory card reader
FireWire, Bluetooth & 2x Fast Infra-red ports
2 Hour Commitment Warranty Express Service**

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Power Slimline Server
Microsoft® Windows® 2003 Web Server Edition

Altos R300

Intel® Pentium® 4 Processor 2.6GHz
Microsoft® Windows® 2003 Web Server Edition
256MB ECC DDR RAM
40GB 7200rpm hard disk drive
Integrated IDE Controller
2 x Integrated Intel® Gigabit ethernet controller
200 watt power supply
3 year on-site warranty with 24x7 hotline support

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Value Performance Server
Microsoft® Windows® Small Business Server 2003 Standard Edition

Altos G300

Intel® Pentium® 4 Processor 2.6GHz
Microsoft® Windows® Small Business Server 2003 Standard Edition, 256MB ECC DDR RAM,
40GB 7200rpm hard disk drive, Dual Channel IDE RAID controller, 3 channel integrated IDE controller
Integrated Intel® Gigabit ethernet controller
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Intel® Xeon™ Processor 2.4GHz
Dual processor capable
128MB ECC DDR RAM (expandable to 4GB)
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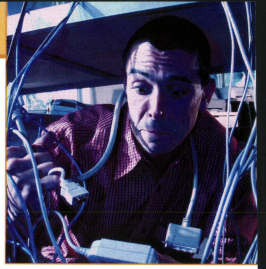

Repair despair

How many times must a defective computer be repaired under warranty before it's replaced?

Dear Watchdog,
I bought a Compaq Presario 1508AP notebook about a year ago. The machine has spent a total of two months at the service centre in four different sessions.

The initial problem was the RAM — I was getting messages like "dumping physical memory" in a blue screen. The same day I got the laptop back after repairs, the machine overheated and took with it the RAM, the motherboard and the battery interface. The machine was again returned to the service centre and this time it took a bit longer to be returned after being thoroughly checked by the engineers.

The day I got the machine back for the second time, the battery wasn't charging. I returned the machine to the service centre, but this time they took almost a month to fix the problem. I had to call almost everyday to get the machine back because I was travelling overseas and I needed to have the machine with me. I was repeatedly told they had to order in new parts because the ones that were sent out to them were DOA.

When it was ready, I tested the machine at the service centre and the battery was charging fine. Until a couple of weeks ago, that is, when the machine wouldn't recognise the battery and would only run off the AC supply. I called the Compaq helpdesk again and the machine had to be sent to the service centre yet again for repairs. The parts were ordered. I called the service centre a few days later to get an update and they said that they had to order in new parts because the parts were DOA again.

After this, I demanded to speak to the team leader. I told him that my work was suffering due to this. I provide after-hours support to customers and I need the notebook to do so. Because I didn't have the machine, the job was assigned to another staff member — preventing me from doing my job properly and getting paid for it.

The supervisor of the helpdesk told me that if my machine failed again after repair they would escalate the situation. Another department would analyse the case and decide whether the machine required repairs or replacement. How much more analysis is required? Isn't four times enough?

Rishi Bery
Clayton South, Vic

The sheer number of issues Bery faced with his notebook — and the time involved — was certainly cause for frustration. With the warranty deadline looming and his work suffering from the downtime, Bery asked Watchdog to intercede on his behalf. Watchdog contacted HP to obtain an answer.

Mystery of the missing voucher

Dear Watchdog,
After doing quite a bit of research I found that the Radeon 9600XT was my best bet on performance and price. The box looked genuine and had the Half Life 2 sticker on the front that I was looking for. I walked out of the shop without any regrets.

I got home and opened the box to find everything but the Half Life 2 voucher inside. So I rang Computer Online and asked them what the story was. I was told by the store that they didn't know where the voucher was, and that they didn't have any vouchers from the distributor available. I am very annoyed at this false advertising. I really want this coupon since I forked out $300 for it.

Daniel Small
Ryde, NSW

Dear Watchdog,
Most of our products come in a boxed form and very rarely come in shrink wrap. From what I understand, the video card that Daniel bought was a GeXCube Radeon 9600XT. In any case, the video card came in a box or retail package and it wasn't shrink wrapped. However, it did have a security/quality assurance sticker on both sides to stop people from tampering with it. That is how we got the video card and that's how we sold it. We did not — in any way — open the box.

However, what we can do for Daniel is offer him a Half Life 2 voucher that we have spare from a different branded video card we received a couple of months ago. That particular branded video card was in the same situation: it too had the sticker but since the game wasn't out yet, the distributor sent us the vouchers a week later. This voucher was an extra one that we received and we would happily give Daniel this one if he wishes to accept it.

Australia Computer Online
Burwood, NSW

Contact us

WE WANT TO KNOW
how IT companies are really treating you. Write to: watchdog@apcmag.com or PO Box 4088, Sydney NSW 1028. Include your full contact details and any product information. All correspondence becomes the property of *APC* and is subject to editing.

Dear Watchdog,
HP is concerned to hear of the less than satisfactory servicing experience Mr Bery had regarding the repair of his notebook and we apologise for the inconvenience caused to him. We have spoken directly with Mr Bery and have resolved the matter to his satisfaction.

HP prides itself on providing customers with superior experiences at all times and we constantly review our service centre procedures to ensure our customers are receiving a beneficial service at all times.

Vickram Bedi
Consumer business manager
HP South Pacific

Watchdog invited HP to detail what action it had taken, at the time of publication the company hadn't responded. When asked, Bery told Watchdog that the company had offered to replace the notebook with a superior model, and that he was awaiting delivery. He noted that the outcome would be satisfactory to him as long as he received the machine on time. HP didn't offer to transfer his working files from one notebook to another, so Bery acknowledged that he'd have to do that himself.

Dear Watchdog,
I recently purchased a laptop from Dell. It turned up with only 256MB of RAM instead of the 512MB that was advertised. Dell told me they could not help. When ordering the laptop I quoted their own E-code for the product that was supposed to come with 512MB, but sometime after paying for it I automatically qualified for a free RAM downgrade!

Brian Green
Salamander Bay, NSW

Dear Watchdog,
Thanks for bringing this to my attention. I followed up on this matter and Mr Green purchased a Dell Inspiron 500m system on 3 December 2003. At this time, the promotion item advertised with that system was a free leather case. In addition, Mr Green was offered a free screen upgrade from XGA to SXGA during his purchase call. Shortly thereafter Mr Green became aware of a new promotion which began on 13 December and offered a free RAM upgrade. Unfortunately as Mr Green's system had already been built and shipped (completed manufacturing on 4 December), it was too late to change the promotion items bundled with his purchase. Mr Green did receive the free leather carry case and screen upgrade promotion with his initial order.

Dell is happy to provide Mr Green with the memory upgrade promo he prefers if he returns the leather case promo. As he cannot return the screen upgrade, Dell is happy to extend him this additional item in goodwill.

Nicole Gemmell
Corporate communications manager
Dell Australia and New Zealand

Order ordure

The "cheque's in the mail" cliché now seems to extend equally to IT retailers. While the practice of retailers charging for goods before delivery (*APC* March, page 31) is defended by stores as an anti-fraud measure, broken promises about stock delivery times is a thorn in the side of honest retailers and customers alike.

Sydneysider Richard Clark was shopping for a specific model LG DVD burner when he found Techbuy (*www.techbuy.com.au*). Despite his inclination to keep shopping until he found a store that had one he could pick up immediately, the store's assurances that the burner would arrive in store by that afternoon were convincing enough for Clark to order it.

"The last thing the salesman said was 'I'll ring you either this afternoon, or tomorrow'. When I heard the word 'tomorrow', the alarm bells in my head rang loudly," Clark told Watchdog.

Clark waited three weeks for his burner, with no contact from Techbuy before he contacted Watchdog. Obtaining the burner was a priority for Clark, who claims to have wasted two days' wages on a junior employee to use the hardware that hadn't arrived. "I get better service from my local video shop," he commented.

Clark told Watchdog that despite having already obtained another DVD burner, he was going to let the order stand to see how long it would take for the company to deliver.

He identified what his main sticking point was. "[Techbuy] not being able to communicate was the worst part... I've built an entire system in the last two weeks, they would have got that business if they could have kept me informed." Clark added that he was building another system, and that he was open to the idea of Techbuy supplying the goods for this system if matters improved.

Watchdog contacted Techbuy with Clark's story. A sales representative at the store told Watchdog that Clark's order had been cancelled — something that Clark was obviously not aware of. When asked why the order had been cancelled, the sales representative stated it was because the company couldn't contact Clark by phone with his supplied number.

Clark had copied Watchdog in on a message he had sent to Techbuy's customer service email address. Watchdog noted to Techbuy's representative that the phone number included in that email was the correct one, having used it. The upshot was that the company had cancelled Clark's order due to a mistake being made on its part. The representative stated that they would contact Clark the same day to ask what action he would like to take.

The company did as promised and contacted Clark. The matter wasn't resolved to Clark's satisfaction, who decided that he wouldn't be purchasing any further goods from the company. Non-delivery aside, Clark's contention that the company lost business by failing to communicate with him is a common complaint of *APC* readers — who generally will show more tolerance if they're kept informed of what's happening.

In last month's Watchdog, Joel Davis couldn't return his LG monitor with its dead pixel for love nor money. When Watchdog contacted LG, the company offered to reinvestigate the case. Davis told Watchdog he was keen to see how far LG's offer of help would extend. "I will... approach them as my [dead] pixel is constant and is near the centre of the screen."

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On Test

Detailed product reviews and comparisons

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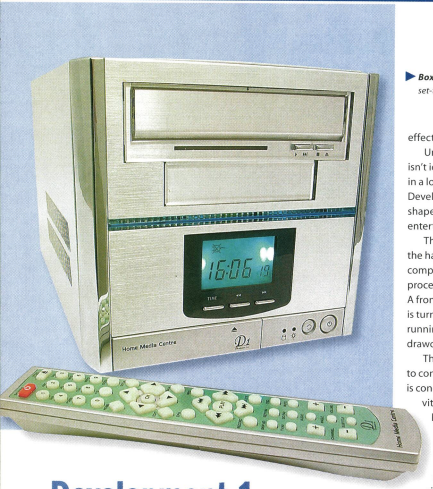
David Lin looks at 10 of the best servers to keep small businesses running smoothly.



▶ ***Box of tricks:*** *the HMC operates as a multi-purpose entertainment unit, offering set-top box, DVD player and jukebox functionality.*

Development 1
Home Media Centre

Development 1 has released Australia's first all-encompassing entertainment box.

***Matthew Overington* reports from the couch.**

There's little doubt that the home entertainment market is booming. Massive TVs, home theatre packages and even projectors are enjoying strong sales while live entertainment is struggling. Aussie company, Development 1, has capitalised on this by developing the Home Media Centre (HMC). Essentially, the device is designed to sit in a lounge room and act as a set-top box, DVD player and jukebox all rolled into one.

The set-top box market is massive overseas, and companies like TiVo have already become household names in the US. The introduction of these devices has been relatively slow in Australia, due in part to the lags in digital TV adoption and the lack of support infrastructure like electronic program guides.

UNDER THE BONNET

The HMC is currently built into an aluminium PC case that's extremely similar to small form factor (SFF) barebones boxes (see *APC* March, page 66). These cases are extremely popular, as companies like Shuttle continue to innovate with complex yet effective cooling systems and elegant internal layouts.

Unfortunately, while a SFF box may suit computer users, it isn't ideal for the HMC. The machine looks a little out of place in a lounge room (mainly because it still resembles a PC) and Development 1 is currently looking to fit the HMC into a case shaped like a VCR or DVD player so it'll blend in with a home entertainment system.

Theoretically, it's possible to collect all the parts and assemble the hardware used in the box yourself. It runs on standard PC components — a small form factor motherboard, Celeron processor, 256MB of RAM, DVD-ROM drive, TV tuner and video card. A front LCD panel can be set to show the time when the machine is turned off, as well as the internal temperature when the HMC is running. While this is undeniably a feasible DIY project, the biggest drawcard for the HMC is its operating system and interface.

The unit runs on Linux and relies on a proprietary interface to control the menus and the machine's functions. All interaction is conducted through a massive RF remote control, which is vital considering these machines are destined for lounge rooms.

An Ethernet port is included so you can plug the HMC into a network and download program information and current weather. You can even transfer videos and music over a home network to the machine for later playback. If you've already ripped your CD collection into MP3, it's relatively easy to transfer the songs into the unit. It's also possible to create playlists and use the machine as a jukebox.

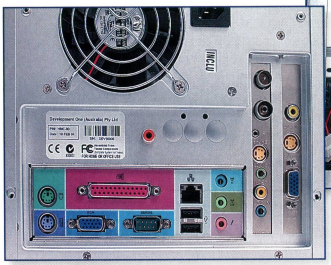
The interface is clean and simple — all driven via the remote control — and is well-suited to the consumer electronics market. Development 1 can roll out firmware and software updates over the Internet without user intervention, so the system automatically keeps itself up-to-date with the latest bug fixes and OS developments.

NOW SHOWING

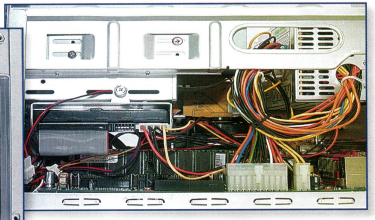
One of the biggest stumbling blocks for companies creating similar products for the Australian market has been the lack of a good electronic program guide (EPG) for Australian broadcast TV. An EPG, as the name suggests, enables users to download a television guide over the Internet and in the case of a set-top box, program the device to record a desired show.

Thankfully, Development 1 has sorted out an EPG for the HMC. The program is easy to navigate with the remote control, and you can set the device to record a show once or regularly over a period of time. The unit can be programmed to record a set timeslot each day, week, or at any other interval, so you can watch what you want, when you want to. Given the time pressures in today's world, the ability to watch TV on your own terms is extremely attractive.

The unit worked a treat during testing. It didn't drop a single frame during recording, and the audio and video streams were always perfectly synchronised. The HMC relies on an analogue TV tuner card, so the quality of the signal is as good as your reception, but this isn't a problem for most users. The machine can't cut



Pick a port: *the HMC comes with a good selection of ports and line-outs.*



A single slot: *only one PCI slot is included on the motherboard.*

advertisements out like some of the TiVo products available overseas, but you can always fast-forward through them on playback. We found the ability to pause live TV exceptionally handy.

WORK IN PROGRESS

One minor flaw is the lack of digital TV compatibility. The card in the unit is limited to receiving terrestrial analogue broadcasts, but this sort of device is perfectly suited to dealing with a digital signal. As digital TV is broadcast in the MPEG-2 format, the machine could theoretically dump the stream directly to the hard disk, mixing in the AC3 audio in real time. Thankfully, digital TV compatibility is slated for inclusion later this year.

As it stands, video is recorded to the hard disk in the MPEG-2, RTJPEG, or MPEG-4 formats, and up to 350 hours of recorded programs can be stored on the 80GB drive. The unit is also available with 160GB or 250GB drives, which will set you back $1,999 and $2,199 respectively.

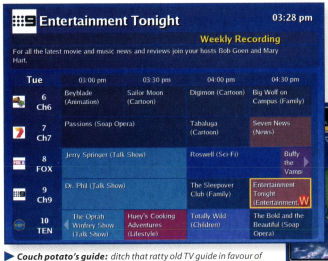
Another useful feature would be the ability to record one channel while watching another or even to record two channels simultaneously. This would require two TV tuners, which is currently impossible as the motherboard only has a single PCI slot. There's also a question of whether or not the Celeron processor in the box has enough grunt to handle the second stream. This functionality could also find its way into a future product when the company moves production over to a different chassis and to digital tuners.

We'd also love to see a DVD burner in the device for the archiving recorded video to DVD. At the moment owners are limited to downloading the footage over the network to other machines for local playback, but we've been assured that this function is also on the way in the next revision.

THE SHAPE OF THINGS TO COME

This is Development 1's first attempt at creating an all-encompassing home entertainment unit, and the first compelling solution we've seen for the Australian market. Although it's a little rough around the edges at the moment, Development 1 is first and foremost a design and innovation company, and work on the device and its successors will continue throughout the year.

Expect *APC* to keep you updated on upcoming developments and, as the company is planning to shift the device's manufacture overseas, lower prices. Without a doubt, the future's looking bright for Australian TV buffs.



Couch potato's guide: *ditch that ratty old TV guide in favour of an electronic version.*

Details

Contact	Development 1
Phone	(03) 9870 1966
Online	www.d1.com.au
Price	HMC80, 80GB $1,799; HMC160, 160GB $1,999; HMC250, 250GB $2,199
✔	Best set-top box for Australia.
✖	Some minor development still needed.
Verdict	●●●●○

▶ ***Wherever I may roam:*** *the Digiwalkers offer good battery life and enough processing power to keep any user happy.*

MiTAC Mio Digiwalkers

From an integrated GPS antenna to a built-in camera, the Mio Digiwalkers offer something for everyone.

Jostling for position in an already crowded PDA market, MiTAC isn't a brand name that's readily associated with handhelds. Nevertheless, its latest crop of Windows Mobile 2003 Pocket PCs are a breath of fresh air against the more prevalent HP, Toshiba and Dell offerings.

At the helm of this pocket armada is the Mio Digiwalker 558. Offering Bluetooth and 802.11b Wi-Fi with both CompactFlash and SecureDigital slots, the 558 is the first to market to offer dual expansion and wireless. Even more impressive is that it all fits into a lightweight 157g package. More standard is the 64MB of RAM and 32MB ROM that all the Digiwalkers are equipped with, though it would be nice to see more RAM put into the flagship model. However, an extra 32MB of permanent storage on the 558 sweetens the deal, useful for installing applications or saving critical documents.

A meaty 400MHz PXA263 Intel XScale CPU offers lots of promise, yet fails to deliver when put to the test. Using Spb Benchmark, it has the highest CPU score of the four PDAs, but it comes in either last or second last on graphics, file system and application tests, despite the other Digiwalkers running the slower 300MHz PXA255 XScale processor. In daily use though, the speed difference isn't particularly noticeable.

The 558 delivers over three hours of continuous use in our rundown tests, though prudent use of Wi-Fi and Bluetooth should see the device's 1,200mAh lithium ion battery comfortably through a day's use.

FEATURES APLENTY

While the 558 is positioned as a wireless workhorse, the 339 is more of a multimedia machine, boasting an integrated 640 x 480 camera, a dedicated Picture Viewer application and a decent set of earphones that can control the Mio MP3 player remotely. The camera can shoot reasonable stills, but don't throw away your dedicated digital camera just yet, as picture quality is on par with other camera phones. The included MioCam application is quite user-friendly though, with onscreen controls for easy switching between video and photographic modes. The bundled Picture Viewer is another handy program, useful for annotating pictures with text or audio and playing your snaps back as a slideshow.

The 168 is easily the most interesting model in the roundup with its built-in GPS receiver. Rather than bundle a case with the unit, its positioning as a portable travel tool is apparent with the car mounting kit and car charger included in the box.

The GPS antenna is well-integrated, folding against the back of the PDA. There's also provision for connection of an external aerial for boosting the signal. However, while the inclusion of GPS in this unit is laudable, the lack of any supporting software is a serious shortcoming, requiring the user to spend another couple of hundred dollars on software and local maps.

The 168's 1,350mAh battery is the largest power plant of the pack. Helped by its slower 300MHz processor, it romps through the rundown tests, staying alive for almost five and a half hours.

The final model in the range, the 336, benchmarks reasonably but quality of this device is questionable. Our test unit had a defective power button, and rather than retain its data long enough to recharge the device upon battery discharge, the 336 immediately lost all of its data. With a 900mAh cell and 300MHz PXA255 XScale processor, we expected it to last at least as long as the 339, easily capable of a day's solid use.

A 12-month warranty for all models is available through the distributor.

All up, MiTAC has delivered an interesting range of devices at reasonable prices. But they'll need to work on their implementation if they want a chance at stealing market share away from stalwarts like HP and palmOne.

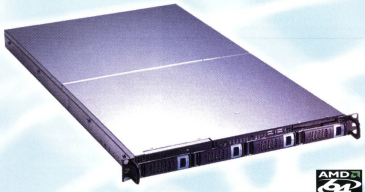
Anthony Caruana

Details

Contact	eProcess Technologies
Phone	(03) 9880 7307
Online	www.justmio.com
Mio Digiwalker 558	
Price	$749
✔	Dual wireless; dual slots.
✖	Disappointing performance; poor documentation.
Verdict	●●●◐○
Mio Digiwalker 339	
Price	$549
✔	Integrated camera; bundled earphones.
✖	Poor documentation.
Verdict	●●●●○
Mio Digiwalker 168	
Price	$599
✔	Integrated GPS; good battery life.
✖	No GPS software; poor documentation.
Verdict	●●●○○
Mio Digiwalker 336	
Price	$399
✔	Low cost; consumer IR.
✖	Limited connectivity; poor quality.
Verdict	●●◐○○

MAXTRON

High Performance Thermal Optimized Servers Powered by AMD Dual Opteron Processors

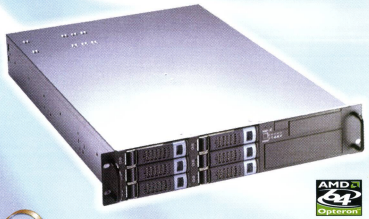


Features

- CSPC-115B 1RU Chassis
- 400W EPS 12V 1U Power
- Tyan Thunder K8S AMD8131 Chipset S2880UGNR M/B for Dual AMD Opteron processors, Dual Broadcom Giga LANs, ATI 8MB Video on board, LSI U320 SCSI on board
- Dual Opteron 244 CPU's
- 12GB Transcend Reg. ECC DDR RAM
- 4 SCSI HDDs
- RAID Controller
- FDD, CD-ROM Drive
- Optional on site warranty
- Digicor Cooling Kit

Features

- CSPC-214B 2RU Chassis
- 460W EPS 12V 2U Power
- Tyan Thunder K8S AMD8131 Chipset S2880GNR M/B for Dual AMD Opteron processors, Dual Broadcom Giga LANs, ATI 8MB Video on board, SATA RAID on board
- Dual Opteron 244 CPU's
- 12GB Transcend Reg. ECC DDR RAM
- 6 SATA HDDs
- SATA RAID Controller
- FDD, CD-ROM Drive
- Optional on site warranty
- Digicor Cooling Kit



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Tel: (08) 9244 3666

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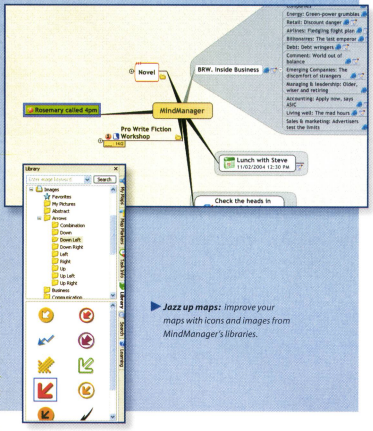


▶ ***Jazz up maps:*** *improve your maps with icons and images from MindManager's libraries.*

Bonus CD software

21-day trial version of MindManager X5 Pro.

▶ ***Easy XML:*** *you can use XML topics anywhere in your mind maps, just drag a Smart Map Part icon into your map.*

MindManager X5 Pro

If you think a mind map is just a brainstorming tool, you'll be amazed at what MindManager X5 Pro can do.

Mind maps are graphical, hierarchical outlines used for planning, enhancing learning and developing innovative thinking. However MindManager X5 Pro offers a lot more behind the scenes, such as hooks into popular Office programs like Word, Project, Powerpoint and Outlook. Additionally, its XML-based architecture makes it ideal as a versatile business tool.

NEW IDEAS

Now 10-years-old, the latest version of MindManager is faster than its predecessors and more intuitive to use. The best new features are the side panel for map libraries, and right-click functionality throughout.

Thanks to its XML (Extensible Markup Language) backbone, you can gather information from sources such as databases, email, documents and the Web, and then insert them into a mind map, often automatically. If you save a mind map as XML, you can send it to your Web site, intranet, scheduler, or to databases, due to XML's cross-platform compatibility.

Users can use both type and handwriting anywhere on the mind map. Even as a simple note-taker, MindManager is superior to Microsoft's OneNote application, and even comes with a version tweaked specifically for Tablet PCs. If you're using the program for taking notes, start with a blank document or choose from a host of templates for scheduling, business, organisation and design processes. Styles can be applied later from the Template Organizer.

MindManager integrates with Microsoft Office, so you can create complete documents within the program while switching between the Map and Outline modes, then send the map to Word, Project or PowerPoint. It also works a treat for structuring long documents, such as reports or book chapters, since information can be seen in macro or micro form by expanding the branches of a map. Maps can be saved as HTML, MindManager or PDF documents. When saved as Word DOC or DOT documents, the maps can be opened in any application (like Star Office) which reads these formats.

The Brainstorming mode allows information to be entered as a list in order to begin a mind map, and can group these items to build up a map later. A panel at the side of the screen lets users access map shortcuts, as well as icon and image libraries. Notes can also be entered into the Notes window for elaboration on a topic, with the option of hiding them to show more of the map. The Map Overview is another handy feature, and displays the entire map as an icon for easy navigation between different parts.

Bundled into the program are a set of useful XML applets called Smart Map Parts, which can simply be dragged into a mind map with no programming skill required. Smart Map Parts pre-installed with the program include a Google API for Web searches. Users can also create their own, or use existing Parts as templates. In the Pro version, users can add information to Microsoft Outlook by dragging an Outlook Linker icon for a task, appointment or note. An Outlook form opens and the program automatically enters information into it.

If you need to create complex relationships, MindManager's multi-map feature lets you see thumbnails of all linked maps, and then click between them, making the program a useful front-end for daily tasks.

EXPANDING YOUR MIND

MindManager is available in X5 Pro and Standard versions, with the main differences being the Standard version's lack of XML support, customisable wizards and templates, and Microsoft Outlook integration. Pocket PC and Tablet PC versions are available, as is a handy plug-in to export the results to an Excel spreadsheet should you need to take the data from MindManager and use it elsewhere.

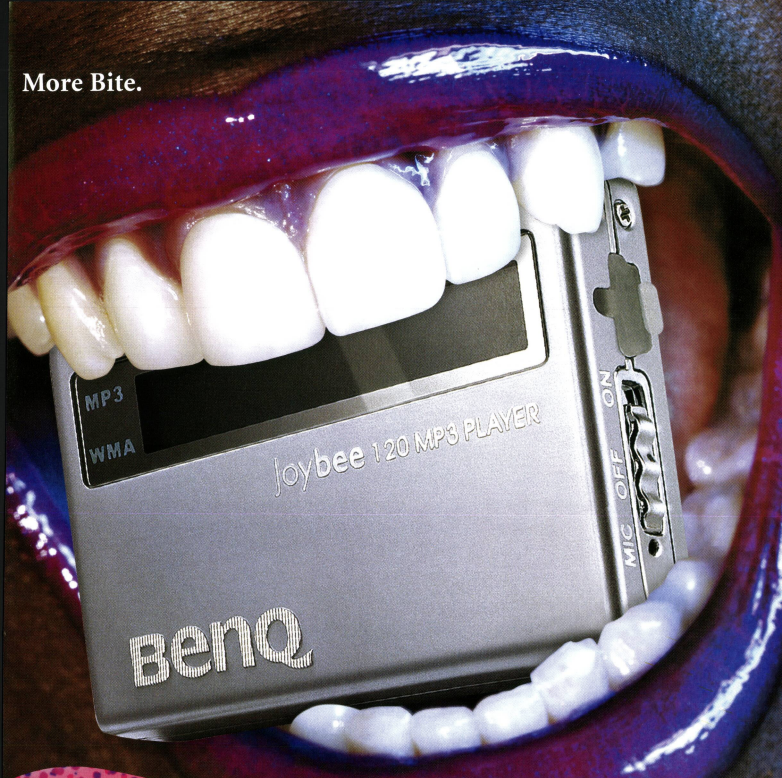
The new outline view, lacking in previous versions, is handy for grouping and developing ideas. Ample tutorials are also on offer to help the beginner get up and running. The learning curve isn't steep enough to be daunting, and the software is both useful and functional. Unless you have a specific need for XML functionality, though, we suggest opting for the Standard version to save yourself a few hundred dollars.

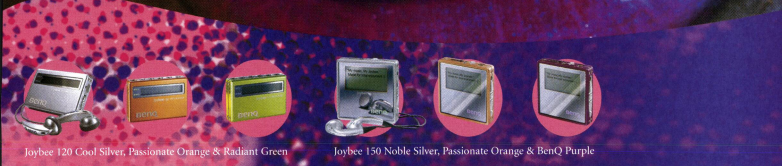
Angela Booth

Details

Contact	Teamlink Australia
Phone	(03) 9787 6107
Online	www.team-link.org
Price	$441; upgrade $138.05
✔	Fast; intuitive interface.
✖	Steep learning curve if you're new to the concept of mind maps.
Verdict	●●●●○

More Bite.





Joybee 120 Cool Silver, Passionate Orange & Radiant Green

Joybee 150 Noble Silver, Passionate Orange & BenQ Purple

Joybee

Introducing the new Joybee compact MP3 players from BenQ with superb sound quality, stylish design and a range of funky colours. The Joybee's are available in two models and come equipped with 128MB or 256MB of memory. Download your favourite songs from your computer, listen to your FM radio or record your voice. You can also use your MP3 player for data storage. Both models support MP3, WMA & WAV audio formats. Joybee, the latest Personal Digital Audio players.

BenQ

Enjoyment Matters

▶ ***Hot swap backup:*** *the NAS T2 offers plug and play-like functionality for backups.*

Fastora NAS T2

and Squirrel Backup

Guilty of not backing up as often as you should?

Allied Information Systems might have the solution.

As we all know, regularly backing up data is a time-consuming and tiresome process. And in the event that you need to recover data, finding the file is also a hassle — assuming you can find the right version, that is. Allied Information Systems has a novel backup solution, consisting of the Fastora NAS T2 and Squirrel Backup software, that makes version control and media management easier.

DUAL DRIVE ACTION

The Fastora NAS T2 is a network-attached storage unit containing two hard disk drives in hot-swappable caddies. Each caddy features a modified USB and power connector and supports any PATA IDE hard drive. By default, drives are configured in a RAID-0 (mirrored) configuration. The idea is that at the end of every day, one of the drives is swapped for another from the media pool. The removed drive is then stored in a fire safe or off-site. Over the next couple of hours, the NAS T2 will rebuild the volume, copying all of the data on the original drive to the newly inserted one.

This has several advantages over traditional tape-based solutions. You don't have to wait for the backup to complete, as the data is continually synchronised until you remove the drive from the NAS T2 device; the data on the drive is an exact copy, so you needn't perform verifications; and restore processes are considerably quicker as hard disks, unlike backup tapes, aren't sequential-access storage devices.

The NAS T2 is also well-equipped for emergencies. If it's destroyed, all you need do is replace the device, remove the drives, insert your backup drive and turn the unit on. Once booted, you can insert another drive to reconstruct the mirror. Additionally, a serial port allows for connection to a UPS in the event of a power failure.

Inside the box lies a VIA 733MHz CPU — not the most powerful processor, but there's not a lot of computational effort required to maintain the RAID array and run the small Web server responsible for configuring the unit. The low heat dissipation also has advantages, making the unit much quieter than many of its rivals. A CompactFlash card stores the FreeBSD installation the unit operates on.

Network connectivity is achieved via the Fast Ethernet and Gigabit Ethernet ports on the back of the NAS T2. The device can be installed on two separate subnets or you can trunk both ports together (provided you have the appropriate switching gear), offering greater redundancy.

When connected to *APC* Lab's Gigabit Ethernet, reading 1GB of files takes just over one minute (16.49 MB/s). Writing the same gigabyte to the NAS T2 takes one minute and 43 seconds (9.78MB/s). These results aren't surprising as write operations typically take longer than read operations.

However, when one of the drives is replaced the unit begins rebuilding the array and the read performance (4.05MB/s) drops well behind the write performance (7.07MB/s). These results indicate that while the RAID array is being rebuilt, write operations to the array are temporarily queued on the source drive, then synchronised after the array has been rebuilt.

NO-NUTS BACKUPS

Complementing the NAS T2 device is Allied Information System's (AIS) own backup software, Squirrel Backup.

The key feature to Squirrel is that data is archived into ZIP format instead of a proprietary compression format. This means the Squirrel client doesn't have to be installed on a machine in order to read archived data — any program capable of opening ZIP files will do. Each file is stored in its own ZIP file and the directory hierarchy is preserved, making finding and recovering files quick and easy. Squirrel allows up to 99 versions of each file to be kept, catering for a sound rollback strategy.

The interface is reasonably intuitive. The Explorer-style panes make finding files simple, but some fiddling is required before you get the gist of how file exclusions are handled. The backup schedule isn't as flexible as we'd like, only allowing for daily and monthly backup schedules.

Overall, the combination of the NAS T2 and Squirrel Backup is a sound solution, and it goes a long way to overcome inconvenience — the main trouble with sticking to a proper backup schedule.

Jarrod Spiga

Details

Contact	Allied Information Systems
Phone	(02) 9997 8844
Online	www.alliedinfo.com.au
Price	Fastora NAS T2, $1,175 plus disks; Squirrel Backup single user licence, $44
✔	Convenient; high redundancy.
✖	Software schedule options.
Verdict	●●●●○

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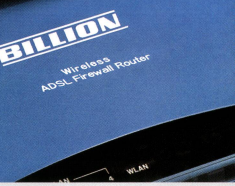

USB ADSL Router

The Billion 7000 features an easy user friendly installation utility and is USB Bus powered. Other features include multi protocol to establish connection with the ISP, supports Windows 98/98SE/ME/2000/XP, MAC OS 9/X, Linux Red Hat.

$89 RRP

4 Port ADSL VPN Router

The Billion 7402 features high speed ADSL with an integrated 4 port switch. Features include a built in VPN Server, SPI Firewall, URL Blocking, SNMP, Dynamic DNS and a host of other features.

Available April

$239 RRP

$289 RRP Wireless 802.11b version

ADSL Router

The Billion 7100S features SOHO Firewall security with NAT technology and Packet filtering, URL Filtering, Universal Plug and Play (UPnP), Web based configuration, firmware upgrade and much more.

$129 RRP

Wireless 802.11g ADSL Router

The Billion 7500G is our flag ship 4 port ADSL Router model. Packed with features including a built in 802.11g Wireless Access Point with WPA support, built in VPN server with up to 16 tunnels, SPI Firewall, Parental control with URL blocking, Dynamic DNS, Syslog monitoring, QoS IP Throttling.

$369 RRP

4 Port ADSL Router

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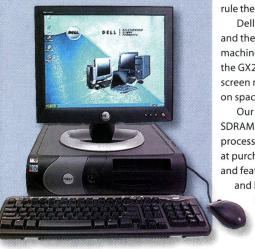
Details

Contact	Dell
Phone	1300 303 107
Online	www.dell.com.au
Price	$2,298 (as reviewed)
✔	Elegant desktop workstation.
✖	We've seen quicker desktops.
Verdict	●●●●○



Dell OptiPlex GX270

Dell's latest entry into the business desktop market appears a solid, sensible buy.

While plenty of PC manufacturers cater to home computing, there are few willing to stake their reputations on providing well-specced corporate machines. The cutthroat world of providing management solutions and quick-turnaround warranty services has caused many smaller vendors to drop out of the game entirely, leaving the big fish to rule the pond.

Dell's OptiPlex range has enjoyed solid sales, and the company's latest corporate desktop machine would be at home in any office. And when the GX270's small black case is paired with a flat screen monitor, it's perfect for a workplace short on space.

Our review unit shipped with 512MB of DDR SDRAM and a 2.6GHz Pentium 4 processor, although processors ranging from 2.4 to 3GHz can be specced at purchase. All machines rely on the i865 chipset and feature either a 533 or 800MHz frontside bus and Intel's Extreme Graphics engine. A 40GB hard disk is included, along with a Gigabit Ethernet port, CD-RW and floppy drives, and a USB mouse and keyboard combo.

The system includes eight USB 2.0 ports, and can also boot from USB, which may appeal to those in a locked down corporate environment.

The model we reviewed included a 15in flat panel monitor, but you can select a different monitor at purchase. As a bonus, the machine can drive two screens simultaneously, which is beneficial to those working in multimedia or Web design environments.

Despite its relatively meagre specs, the OptiPlex performs well under benchmarking, notching up 31.6 under Business Winstone 2002 and 43.6 in Multimedia Content Creation Winstone 2003. We've seen machines with similar specs perform slightly quicker, but the OptiPlex is hardly a laggard.

A compelling point for business consumers is Dell's three-year, next business day on-site warranty. In addition, a suite of diagnostic tools on the hard disk enables either remote or local troubleshooting. The systems support remote OS and BIOS updating — a dream come true for admins strapped for time. In a busy work environment, where any delays in productivity translate directly to the bottom line, Dell appears to have all bases covered.

Matthew Overington

Details

Contact	Westan
Phone	(03) 9541 8888
Online	www.westan.com.au
Price	$320
✔	Compatibility.
✖	No backup software; inflexible.
Verdict	●●○○○

Western Digital Series II USB

Effortlessly move around large volumes of data with Western Digital's latest storage solution.

The demand for external drives that can shift large amounts of data from one location to another has skyrocketed over the last few years — so much so that they're fast becoming a commodity item. This is due largely to a rapid increase in the capacity of external hard drives, along with a corresponding decrease in price. So what makes Western Digital's latest offering so special?

In short, nothing really. Several other drives on the market ship with 160, 120 and 80GB capacities. Western Digital has chosen to use run-of-the-mill Parallel ATA 7,200rpm drives in these enclosures, though it would have been a breath of fresh air to see it use 10,000rpm Raptor drives. The Series II has a USB 2.0 interface, and even though it's slower than FireWire it has the advantage of a large compatibility base.

Our tests show burst read rates to the order of 24.86MB/s, with an average rate of 22.77MB/s. As expected, read performance is marginally slower, reaching a peak figure of 19.44MB/s and average of 15.95MB/s.

The retail box ships with a 1.8m USB cable, power supply and quick install guide. No other goodies (such as software or localised support information) are included. While the darker grey section of the case slides off fairly easily, there's no simple way to open the remainder of the case, meaning that only the bravest of tinkers will be able to replace the drive inside.

Since the Parallel ATA interface is considerably faster than USB 2.0, any bottleneck you'll experience is due to the plug-and-play interface. The cache is used to maintain data flow between the disk and its controller, while the mechanical drive head tracks to a different location on the disk platters.

The Series II ships with a 2MB cache, but this isn't much of a concern in real-world applications as the controller doesn't request data much faster than the disk reads it. We measured a random access time of 13.4ms, smack on target with the 8.9ms seek time and 4.2ms latency quoted on the spec sheet.

There's nothing wrong with the Series II itself. It's just that there are dozens of other drives available with more flexibility and features than this one.

Jarrod Spiga

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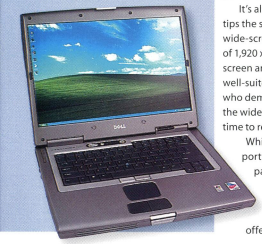
Details

Contact	Dell
Phone	1300 303 107
Online	www.dell.com.au
Price	$4,893
✔	Powerful; large screen real estate.
✖	Hefty price tag.
Verdict	●●●○○



Dell Precision M60

Is Dell's latest powerhouse the dream portable for architects, engineers, or performance junkies?

The Precision M60 sits firmly towards the top of Dell's notebook range in terms of both specs and price. With a 1.6GHz Pentium M processor at its heart, this machine gets the full Centrino treatment. Our review model also shipped with 1GB of DDR RAM and a DVD-RW drive, making it one of the most powerful notebooks we've seen.

It's also one of the biggest. This hulking unit tips the scales at 3.5kg and features a 15.4in wide-screen display running at a native resolution of 1,920 x 1,200 pixels. This combination of large screen and high resolution means the M60 is well-suited to engineers, designers or architects who demand generous screen real estate. Of course, the wide-screen display also doesn't hurt when it's time to relax and watch a few DVDs, either.

While the screen is impressive, the suite of ports also doesn't disappoint: FireWire, serial, parallel, Gigabit Ethernet, modem, audio, USB, S-Video out and PC Card connectors adorn the unit.

It's not surprising that the Dell offers impressive benchmark performance figures, including a performance rating of 167 under MobileMark 2002. What is surprising is the MobileMark 2002 battery rundown time of three hours and 29 minutes. This is largely due to the efficient Centrino platform, but the whopping nine cell Lithium-ion battery can also take some credit. Considering that this test was run with the CPU at full speed, the display set to its brightest setting, and no power-saving functions enabled, the M60 is good for well over four hours of normal operation. The M60 also manages a 3DMark2003 score of 3,026 thanks to the Quadro FX Go700 graphics controller, meaning it can also fit the bill as a gaming platform.

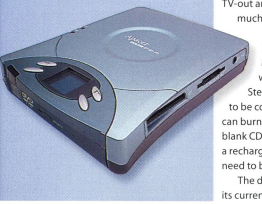
A machine of this calibre can easily serve as a primary work computer (with the added benefit of being portable), and could potentially spend a lot of time desk-bound. An extensive list of extras for the M60, such as a docking station and external DVD-ROM drive, are all available from the Dell Web site.

For anyone looking for a powerful 32-bit notebook with plenty of battery life and a huge screen, the M60 deserves a close look. Unfortunately, the price tag of nearly $5,000 will scare away all but the most serious buyers.

Matthew Overington

Details

Contact	Bluechip Infotech
Phone	1800 803 802
Online	www.bluechipit.com.au
Price	$499
✔	Highly versatile; fully featured; well-designed.
✖	No DVD movie support; expensive.
Verdict	●●●●○



Apacer Disc Steno CP200

Apacer's Disc Steno CP200 is the perfect accessory for any digital photographer.

The advantages of digital over 35mm film cameras for most amateur photographers greatly outweigh the negatives. But while it's easy to carry many rolls of film on long journeys, it can be difficult to store large numbers of digital images away from a PC.

Enter the Disc Steno; a CD burner designed to act independently of a computer. This device offers a swathe of features, including a seven-slot memory card reader, a 24 x 24 x 10 CD-RW/DVD-ROM drive, TV-out and a USB 2.0 port, all in a unit that's not much bigger than a Discman.

The drive supports all popular card formats — SC1/2, SD, MMC, Memory Stick, Memory Stick Pro and SM, so it can be used with just about any camera. But the Disc Steno's best feature is that it doesn't need to be connected to a computer to burn CDs — it can burn directly from an inserted smart card to a blank CD or CD-RW. And because it's supplied with a rechargeable 7.4V Li-ion battery, it doesn't even need to be plugged into the mains.

The device has a mini-LCD panel which displays its current mode and simple navigation system. It also has an onscreen display that functions in eight languages. A nifty IR remote control is also included, which is perfect for running through the image viewing features.

The TV-out jack supports standard RCA TV connections as well as stereo audio output. This is great as the Disc Steno can read and playback JPEG, MPEG-1, MPEG-2 and MP3 file formats. In other words, you can plug it directly into your TV (supports NTSC and PAL) to show images, play VCDs or standard CD/DVD with MPEG-format movies, or plug it into your stereo input for MP3 playback. The device has an automatic slideshow feature, can rotate images onscreen, enlarge them to four times their normal size, and display up to six preview images at once.

When not in use as a playback device, the Disc Steno can plug directly into a computer's USB port (USB 1.1 and USB 2.0 compatible) and serve as a CD burner and card reader. The burner has a 2MB buffer, which is enough to prevent issues with JPEG transfer.

Despite having a DVD-ROM drive, it can't read regular DVD movie discs, but this is our only criticism of note.

James Bannan

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Details

Contact	Comsol
Phone	(02) 9701 8800
Online	www.comsol.com.au
Price	$1,295
✔	Flexible host configuration; secure.
✖	Price; platform dependent client.
Verdict	●●●○○

Avocent SwitchView IP

The SwitchView IP offers more control than software-based remote connectivity solutions.

Remote connectivity software has become increasingly popular thanks to Windows' Terminal Services and open source software such as VNC. However, these solutions aren't complete. BIOS-level control isn't possible, many are platform-specific, and devices such as KVM switches aren't supported.

Ideal for system administrators, the SwitchView IP is a device that acts as a remote terminal via IP. This gives users a virtual keyboard, mouse and monitor for the remote system in front of them, regardless of where they're connecting from.

The SwitchView officially supports Windows, Red Hat Linux and Novell hosts, but we also successfully tested the unit on a Mac. It can also interface with KVM switches, allowing the administrator to control numerous systems from a remote location.

The black box simply plugs into the VGA, PS/2 keyboard and mouse ports on the remote host. Support for USB keyboard and mouse interfaces on the host is provided by connecting a supplementary USB cable. Connecting a keyboard, mouse and monitor to the unit and local control is possible and remote reboot unit connectivity is also supported.

IP configuration is static by default, but DHCP configuration is available. ARP can be used to initially change the IP configuration, but if you forget the IP address, there's no easy way to rediscover it without resetting the device's configuration.

Connecting to the SwitchView is a breeze. Simply launch a Web browser, enter the IP address, log in and launch the console — full 128-bit SSL encryption ensures secure login and connection to the server. The client is capable of displaying text and graphics modes up to 1,280 x 1,024, however only Windows clients are supported. Windows also prevents use of certain keyboard combinations on the remote host, but selecting the appropriate option from the menu will send the command through to the host.

The unit features a user-level authentication and permissions system, access logging and auditing, SMTP notification, SSL configuration and a firmware upgrade applet. These are configurable through the console's Web interface.

This device isn't cheap, but if you need secure BIOS-level control over a range of systems, the SwitchView IP will serve you well.

Jarrod Spiga

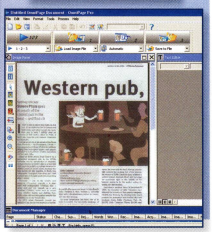
Details

Contact	Scholastic New Media
Phone	(02) 4329 9472
Online	www.scholastic.com.au/newmedia
Price	$1,279 (upgrade $429)
✔	Easy to use; widely supported; many features.
✖	Expensive.
Verdict	●●●●○

ScanSoft OmniPage Pro 14 Office

ScanSoft stays ahead of the rabble as the industry leader in OCR packages.

Optical Character Recognition software has long-since passed cool gadget status, and although the software niche has dropped off the radar for most early adopters, it still enjoys massive popularity in legal and academic circles. The leader of the pack has long been ScanSoft's OmniPage range, now in its 14th iteration.



At first, the software appears little different to the previous version. Users can either scan directly or import an existing file to serve as a source. The list of supported formats include TIFF, JPEG, BMP and even Acrobat PDF files.

After you've sorted out the source, the software works by making an educated guess about the elements of a page you'll want to keep and what format you want them in — graphics, tables or plain text. The theory is that it can recreate the page for export to any number of formats (including all Microsoft Office files), in the same layout as the original if desired. The software can't make much of a smudged scan or text running in weird directions, but if given clear input, the results are impressive — we averaged around 85% accuracy during informal testing. Even the page formatting works quite well.

Run of the mill OCR is one thing, but what really makes OmniPage Pro worth the money is that it's not just a vanilla-flavoured productivity tool. ScanSoft has crammed it full of useful extra features to make a thankless job easier. The user can now tackle repetitive conversions by designing a batch workflow for them — including emailing your output. The program can also watch "hot" folders the way Adobe Acrobat does, and it has full speech capability in up to seven languages. You can make proofreading corrections using speech, which greatly reduces editing time.

While the character recognition engine is slightly tweaked over version 13, it's the productivity enhancements where OmniPage Pro really shines. In the OCR world, it's clearly the winner in an imprecise race.

Drew Turney

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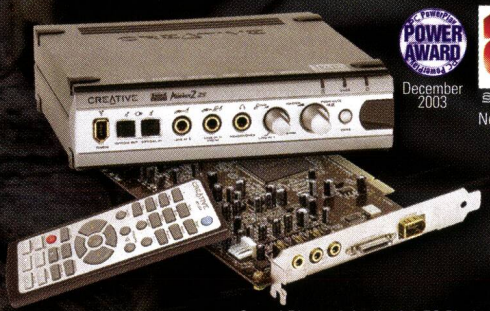

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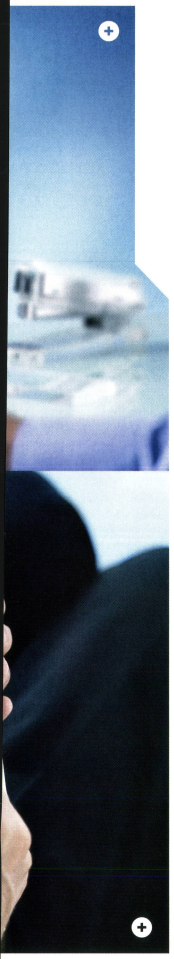

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TOSHIBA

Photo printers

As digital cameras continue to drop in price, *James Eke* examines a selection of printers capable of turning your images into perfect prints.

It's no secret that digital cameras have hit the mainstream. Five megapixel units have dropped below $1,000, meaning that high-quality digital photography is within the reach of an ever-increasing number of consumers. But why not take it one step further and print the images yourself?

DIY photo printing delivers a saving on traditional photo lab development, even when factoring in the cost of high-quality paper, ink and the printer itself. At the same time, the software market for photo editing and organising is expanding rapidly: new features are being added to existing products, and new players are entering the game.

Essentially, there are two types of printers suitable for personal photo printing: inkjet and dye-sublimation. Most units tested here (and indeed the majority of machines available) are inkjets.

In the past some inkjets suffered from poor resolution, but advances in print head technology has made this difference harder to pick. While ink printers have been around for decades, dye-sublimation printers are a relatively new technology. They don't lay down the colours as individual dots like inkjets, but rather as a strip.

Inkjets tend to be the least expensive on offer — some can even be purchased for a little over $100. In fact, quite a few of the manufacturers sell printers at a loss and recoup the shortfall through ink cartridge sales. It's not hard to find printers on sale for less than what you'd fork out for a set of cartridges, so it really pays to do some research before taking the plunge.

While a printer may seem cheap, the ongoing cost of replacement cartridges can quickly negate any savings made during the initial purchase. If you're only going to print photos occasionally, this isn't too much of an issue, but if you're planning to push the printer hard, a comparison of cartridge prices is strongly recommended.

How we tested

Each printer was connected to a 1.4MHz Athlon with 512MB of RAM running Windows 2000, with Service Pack 3 installed. Although most printers have more than one input, they all have USB so that was the only connection tested.

The printers were all examined using the same four control images — rich in colour and brightness. Using Epson premium glossy photo paper, three were printed on 10 x 15cm cards and the last on A4. All prints were done at the highest possible print quality setting and maximum resolution.

We used Adobe Photoshop Album 2.0 as the print engine as only a few printers supplied printing software. Printing was timed and then averaged. The printed images were studied for colour balance, brightness and contrast, while also paying attention to the appearance of streaking, banding and other flaws.

HP Photosmart 245

Tipping the scales at only 1.3kg, HP's Photosmart 245 more than pulls its weight. The unit offers a maximum print resolution of 4,800 x 1,200dpi, but is limited to 10 x 15cm prints.

The machine includes multiple input slots and accepts six different types of memory cards, including SmartMedia, CompactFlash, Sony Memory Stick, Secure Digital, MultiMedia and xD-picture cards. These slots are also mounted as virtual drives when connected to a PC, allowing the printer to serve as a memory card reader. However, the USB cable for connecting it to a PC is an optional extra.

One of the best features of the 245 is the ability to print directly from a memory card or camera. Images can be previewed on a 1.8in colour LCD before being printed, making it ideal for using on the road.

Clearly marked buttons for zoom, select, print, and number of copies let you look at images, select print ranges, and print images either individually or in batches.

Under testing, the HP unit really impresses. Printed photos have sharp images with good tone and colour balance, and no visible traces of streaking or banding. Of all the printers tested, only the top-of-the-line Canon and Epson printers manage better-looking photos. Printing time is comparable with most of the printers tested, averaging just over two minutes to produce one 10 x 15cm print.

Combining the Photosmart's size with quality output makes for a nice all-round package. As a personal photo printer, the 245 would be at home on most home desks or in a small business environment for printing limited numbers of invitations or pamphlets. Unfortunately, a refill cartridge will set you back around $70, so the ongoing running costs may be a limiting factor for some.

Details

Contact	HP
Phone	13 23 47
Online	www.hp.com.au
Price	$438.90
✔	Small; multiple inputs; inexpensive.
✖	Expensive cartridges; no USB cable.
Verdict	●●●●◐

Canon Bubble Jet i865

Canon's Bubble Jet i865 isn't strictly a photo printer, but nonetheless achieves some impressive results when handling images. The unit is equipped with USB and parallel ports at the rear and a direct print port at the front, making it possible to print directly from a camera without a PC.

The unit employs five separate ink tanks including an extra large one for black, which helps keep ongoing costs down. Replacement cartridges are a competitive $21.95 each.

The i865 produces bright, sharp photos at the maximum resolution of 4,800 x 1,200dpi. Contrast is a little low and some of our control prints appear a little washed out compared to the other printers' results.

Although the image quality is high, the most impressive feature of the i865 is the time it takes to produce 10 x 15cm photos. It's the only printer in the roundup to clock an average print time below one minute.

Canon printers ship with an impressive software suite, including nine printing utility programs for enhancing, stitching and correcting photos. A tray is also included for printing onto CD/DVD media.

If you find yourself printing a lot of photos and speed is a crucial consideration, then look no further. If superior photo quality is more important than pure speed, you should look elsewhere.

Details

Contact	Canon
Phone	1800 021 167
Online	www.canon.com.au
Price	$399
✔	Extremely fast.
✖	Low contrast.
Verdict	●●●●◐○

Canon Bubble Jet i965

Although closely resembling its cheaper sibling, the i965 has some distinct advantages over the i865. The biggest external difference is the larger perspex window on the front, but Canon has also replaced a rear parallel port with USB 2.0. Direct camera-to-printer output is also supported with a third USB port at the front of the machine.

The unit offers a maximum resolution of 4,800 x 2,400dpi and employs Canon's thermal inkjet technology to transfer images to the page.

Canon has constructed a print head for the i965 that employs 3,072 x 10-micron diameter nozzles to squirt ink onto the page. This enables the printer to achieve fine resolutions at a high print speed. Canon claims that the unit is able to print a single 10 x 15cm print in 21 seconds, but we found the actual print time to be around one minute at the maximum resolution. The unit employs six individual ink tanks and produces bright, crisp tones in areas of both light and shadow. In fact, it produces some of the best photos of any of the printers tested. The images are clean, show good detail and balance, and don't suffer any flaws.

The i965 produces high-quality prints at an acceptable speed and lower price than the top HP inkjet and HiTouch dye sublimation machines.

Details

Contact	Canon
Phone	1800 021 167
Online	www.canon.com.au
Price	$549
✔	Great quality.
✖	Small black ink tank.
Verdict	●●●●○

Epson Stylus C63

The Stylus C63 is Epson's entry-level printer from its new DURABrite solutions range. Epson has continued its support of pigmented inks in the desktop market and introduced individual cartridges for each colour. The INKdividual system is designed to lower the cost of printing, a move applauded by *APC*.

Epson employs a technology dubbed Variable Size Dot Technology (VSDT) in the C63. Regular ink printer cartridges can only produce ink droplets of a uniform size, but VSDT can create droplets of six different sizes, providing the ability to fill large areas of colour more quickly than traditional designs. This is supposed to improve print times and Epson claims that the technology also results in prints with much finer detail, less grain and smoother gradations over older technology.

Unfortunately, this claim falls down in testing, with the Stylus C63 producing low-quality photos, even on Epson-branded photo paper. All prints produced by the unit appear rough and pixellated, even at a resolution of 5,760 x 1,440dpi. The colour balance, contrast and brightness are acceptable but the unit is let down by the poor fine detail. The average time taken to print a 10 x 15cm photo is three and a half minutes, also well behind the pack.

Despite the fact that the print quality is low, the Epson C63 will appeal to many due to its low initial cost and inexpensive running costs.

Details

Contact	Epson
Phone	1300 361 054
Online	www.epson.com.au
Price	$179
✔	Inexpensive.
✖	Poor quality output.
Verdict	●●○○○

Epson Stylus Photo R310

The more expensive Epson unit in this roundup gave us a pleasant surprise under testing, despite the relatively low price tag compared to similar machines. The R310 employs Epson's proprietary waterproof DURABrite dye-based inks, which produces some of the best results of the printers tested.

The printer manages a maximum resolution of 5,760 x 1,440dpi and outputs extremely high-quality images. The sample photos are clear and bright, although they're not as good as the output from the HP and HiTouch units. A 10 x 15cm photo takes just over two minutes to print, which is on par with the other inkjet models in this roundup.

Single-colour ink cartridges help reduce ongoing costs, and the ability to print directly from one of five memory cards is a nice touch. Expert and novice menus provide basic, one-touch printing, or more advanced settings for extremely high-quality results.

Optional extras are available, including a preview monitor for printing directly from a memory card and a Bluetooth adaptor for wirelessly printing from a notebook, PDA or phone. However, these devices each add $199 to the price.

The Epson is a solid all-round unit without being exceptional: prints are slightly above average; print speed acceptable and menu systems functional. The unit is well-priced, but this saving is negated by the fact that you have to pay extra for the preview window.

Details	
Contact	Epson
Phone	1300 361 054
Online	www.epson.com.au
Price	$399
✔	Single colour ink cartridges.
✖	Preview monitor is optional extra.
Verdict	●●●◐○

HiTouch Photo Printer 630PS

Looking a little out of place among many of the desktop printers, the dye-sublimation HiTouch (HiTi) unit produces some of the best results of this Labs Challenge. One of the advantages of dye-sublimation technology is that the cost of printing is relatively cheap. It's possible to pick up a ribbon and 50 sheets of photo paper bundled together for $50.

The unit only accepts SmartMedia and CompactFlash cards. A preview screen allows navigation through the pictures stored on a memory card when the printer's not connected to a PC.

Printouts are impressive, showing bright, vivid colours with no traces of streaking or flaws on the test images. The HiTi is just as fast as the inkjet printers in this roundup, and the unit clocks an average time of two minutes and 20 seconds for a 10 x 15cm photo.

It's not all good news, though. The bundled software, Photo Desiree, is simplistic and lacks features when compared to the editing suites offered by its competitors. Also, the unit is limited to printing photos.

Those looking for a printer solely to print photographs will be well served by the HiTouch unit. Unfortunately, the price tag means that anyone on a tight budget will be persuaded to look elsewhere.

Details	
Contact	Bluechip Infotech
Phone	1800 803 802
Online	www.bluechipit.com.au
Price	$499
✔	High quality prints.
✖	Only prints photos.
Verdict	●●●●○

Dye-sublimation versus inkjet

Almost all of us are familiar with the way inkjet printers work. Minute drops of ink are squirted on the paper as a printer head (containing the ink tanks) passes over the paper.

Dye-sub printers, on the other hand, are less common. These work by applying dye from a coloured ribbon directly onto the page. This dye is then heated to fuse the print to paper. The process is repeated for each colour — cyan, magenta, yellow and black. Finally, a clear coat is fused on top of the dyes.

One of the main advantages that dye-subs have over inkjets is that the process gives smoother results with less dithering in the image. If you look at an inkjet print, you should be able to see the different coloured dots. When a transition between shades is printed, dithering is noticeable. This is caused by different coloured dots being laid down on the paper in various patterns, making up the gradient. A dye-sub printer mixes the dyes, making up the colour before laying it down on paper. This gives a much smoother gradient between shades, although if you look really closely, it's still not perfect.

The clear coat fused on top of the dye-sub print produces photos that are more resistant to colour fade from exposure to ultra-violet light. Dye-sub machines usually print jobs at a slightly faster rate in most instances.

However, the main negative point about dye-subs is the cost. While the prices are affordable when you're printing 10 x 15cm photos, the complexity of the process means that you'll pay more as the size of the page is increased. Inkjets are also a lot more flexible, as they perform most office printing tasks adequately without incurring a high per-page cost.

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HP Photosmart 7960

The HP Photosmart 7960 is the 245's big brother (page 56), and sports a similar look and colour LCD preview screen. The 7960 has all the functions of the 245, plus the ability to rotate images, print larger photos and send email directly from the printer. HP also includes support for the standard suite of memory cards.

A direct USB printing port is located at the front of the device, so if your digital camera has onboard memory it can be directly connected to the unit to print. This means that you don't have to rely on a PC or notebook to print images from cameras with internal memory — although it's unable to print at the maximum resolution while in this mode.

Like the 245, the 7960 prints at a maximum resolution of 4,800 x 1,200dpi, but although both units have similar specs, the images from the 245 are sharper than those produced by its big brother. The colour, brightness and contrast from the printed images are spot-on, but the lack of sharpness detracts from the overall product.

Using four separate ink cartridges ranging from $40 to $55, the HP 7960 may become a little expensive to run in the long term, but for those looking to produce photos without a PC, this is a solid unit. That said, there are printers out there producing better results at a lower cost.

Details

Contact	HP
Phone	13 23 47
Online	www.hp.com.au
Price	$768.90
✔	Multiple inputs.
✖	Size and weight.
Verdict	●●●○○

Lexmark Z705 Photo Jet

Lexmark's only entry to the roundup is a bit of a disappointment. It's obvious the Z705 is a no-frills printer. It can't print directly from a camera, features a single USB port and doesn't include memory card slots.

Similar to the Epson printers, Variable Droplet Size technology is employed to (theoretically) speed up printing solid bands of colour. Lexmark claims the Z705 can print a 10 x 15cm photo in around one minute. During testing at the printer's highest resolution, we recorded an average print time of around 10 minutes for a single 10 x 15cm photo. This is by far the slowest of all the printers in this roundup.

Even less impressive than the slow print time is the quality of the photos produced by the unit. The level of detail is acceptable, but all photos are dark and lack contrast at the maximum resolution of 4,800 x 1,200dpi. There are no problems with the level of detail, but printed photos suffer mildly from banding and streaking.

Another negative point about the unit is the integrated colour tank. If it runs low on one colour, all colours have to be replaced simultaneously. At least the Z705 features a separate cartridge for black ink, so it can be used to print monochrome text without severely impacting on running costs.

At $149, the Z705 is considerably cheaper than similar printers, but its speed and quality are also noticeably lower.

Details

Contact	Lexmark
Phone	1300 362 192
Online	www.lexmark.com.au
Price	$149
✔	Low price tag.
✖	Slow; poor quality output.
Verdict	●◐○○○

Photo printers

Manufacturer	Model	Memory cards accepted: SM	CF	MS	SD	MMC	xD	Memory Stick	Price	Cartridge price	Maximum paper size	Print time 10 x 15cm photo (seconds): Photo 1	Photo 2	Photo 3	Average	Print time A4 photo: Minutes
Canon	Bubble Jet i865								$399	$21.95 each	A4	70	50	45	55.0	3.1
Canon	Bubble Jet i965								$549	$24.95 each	A4	80	65	55	66.7	2.4
Epson	C63								$179	$13.95 each, black $20.95	A4	190	210	200	200.0	3.5
Epson	R310	✔	✔	✔	✔	✔	✔	✔	$399	$16.66 each	A4	135	125	130	130.0	3.2
HiTouch	630PS	✔	✔						$499	$49.95 for cartridge + 50 sheets of paper	10 x 15cm (4 x 6in)	120	115	115	116.7	N/A
HP	PS245	✔	✔	✔	✔	✔	✔		$438.90	$73.95 each	10 x 15cm (4 x 6in)	140	130	120	130.0	N/A
HP	PS7960	✔	✔	✔	✔	✔	✔	✔	$768.90	Photo ink$40.71, tri-colour $55.58, grey $40.71	A4	130	125	120	125.0	3.4
Lexmark	Z705								$149	$42 each, black $51	A4	610	650	630	630.0	10+

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Pioneer CentriNote 350 Notebook

RRP from $1899

- Intel Centrino™ mobile technology
- Intel® Pentium® M Processor 1.4/1.5/1.6/1.7Ghz
- Intel PRO/Wireless Network Connection 802.11b
- Intel 855 PM Chipset
- 128M/256M/512M/1G DDR RAM
- 30/40/60/80 GB HD
- 24X CD / 24X CDRW&DVD Combo / DVD-RW
- 14" XGA Intel 32M VGA
- 100/10M Lan, 56K Modem, 1394 Firewire
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- **Microsoft® Windows XP Home / Professional**

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- 24X CD / 24X CDRW&DVD Combo / DVD-RW
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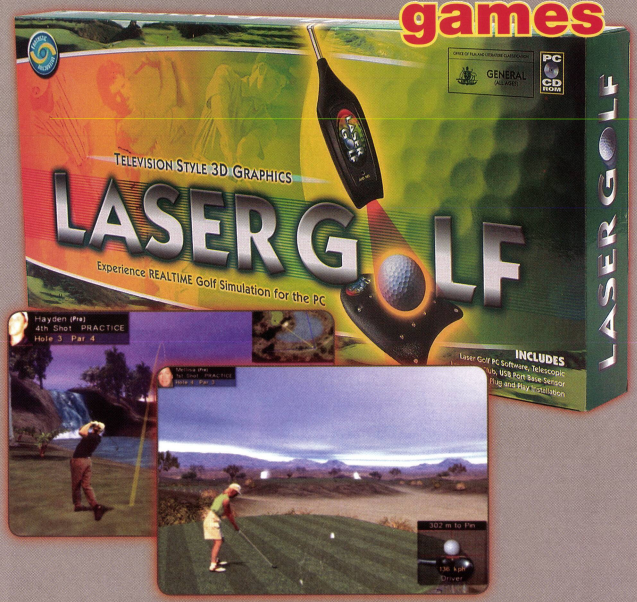

LaserGolf is a completely new approach to playing golf on a PC, as it allows you to actually swing a club rather than use a mouse. LaserGolf can be used on a PC running Windows 98, ME, 2000 or XP and requires a 3D graphics accelerator card. For more information visit the Web site at www.LaserGolfGame.com

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Virtual PC software

If one computer isn't enough, why not create a "virtual PC"? *Serdar Yegulalp* looks at three apps which enable you to have two PCs for the price of one.

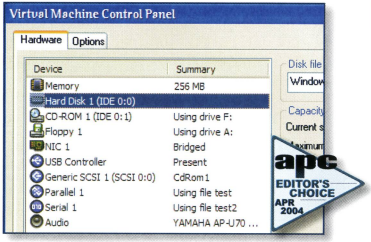
Thanks to a clever new breed of software program called "virtual computers" or "machine emulators", you can often get two (or more) powerful desktop PCs for the price of one. These programs simulate an entire computer — complete with hard drive, memory, peripherals, and so on — which runs in a window on the desktop, and is capable of booting and running an OS on its own.

Most virtual machine programs exploit a trick in recent Intel/AMD processors that allows this operation without a massive performance hit. Memory and hard disk space are "borrowed" from the host computer, as well as processing power. The emulated machine can usually run at something like one-half to two-thirds the speed of the host, depending on the circumstances. A powerful machine (2GHz or better) usually feels like a fully-fledged PC of its native speed.

Virtual PCs come in handy in a variety of scenarios. One of the most common is testing a variant operating system when there's no spare machine to load it on. For example, if you're using Windows and want to try out a Linux distro (or vice versa) without the hassle of making a separate partition and fiddling with boot tables, a virtual PC is a seamless way to do it. Another common use is as a "guinea pig" computer or "sandbox" for testing software or even network environments, which can be wiped clean and reset without too much difficulty.

How we tested

We tested three virtual machine products — two commercial programs and one free open source package: VMWare Workstation 4.0, Microsoft Virtual PC 2004, and Bochs. All software reviewed was run on a dual-processor AMD Athlon 2400+ MP with 1GB of RAM. Each virtual machine was loaded with a copy of Windows 2000 Service Pack 4 with IE6 and all the latest post-SP4 fixes. For performance testing, we ran WinMark99 and CPUMark99 on VMWare and Virtual PC.



VMWare Workstation 4.0

VMWare, now in its 4.0 incarnation, is probably the most widely recognised virtual machine software. It was the first, and remains the best by virtue of having the broadest wealth of useful features.

A virtual machine (VM) can be created either "by hand" or through a wizard, where a number of common operating systems can be supported with preconfigured options. Creating a VM involves setting up a virtual hard disk (basically a giant file on the host computer's hard disk), selecting virtual hardware, and then booting into the VM to load an OS. The VM also has a BIOS of its own, which can be edited in exactly the same way as a real PC.

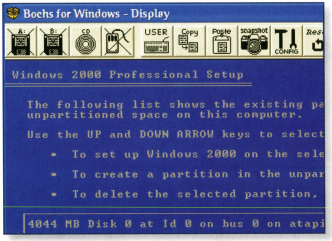
Once the OS is set up, VMWare provides a set of operating system-specific utilities — video and mouse drivers, in the case of Windows — which allow for more seamless integration between VM and host. The mouse driver allows the mouse cursor to freely move in and out of the VM as if it were simply another window.

Many of VMWare's features and behaviours have been copied into Virtual PC. VMs have a broad variety of customisable options — memory usage, type of hard disk (IDE or SCSI) and choices about other virtual hardware that can be connected, such as sound or network cards. CD/DVD drives can be accessed directly by the VM, or the user can specify an ISO image. Networking can be done via NAT through the host machine's network address, or by having the VM's network interface appear as a separate piece of hardware. Copy and paste, as well as dragging and dropping files, works transparently to and from the VM (although the VM has to have the emulator tools installed to do this). VMs can share folders with the host machine, to allow easy transfers of files.

VMWare also has features not seen anywhere else that make it the prime choice. The Snapshot function preserves an image of a VM at a given point in time, which can be restored later as a quick way to recover from disaster or to return the machine to a pristine state. Hard disk images can also be selectively excluded from snapshots if required.

Details

Contact	MicroWay
Phone	1300 553 3 13
Online	www.vmware.com
Price	Full version: $440 Full version (download): $375 Upgrade: $215 Upgrade (download): $145
✔	Flexible virtual hardware.
✖	Price; slower disk speed than Virtual PC.
Verdict	●●●●◐



Bochs 2.1

Bochs stands apart from VMWare and Virtual PC for two reasons. One, it's a free, open source product, not a commercial program, so it's not as user-friendly as the others. Two, it's not intended to be a full-speed virtual machine, but rather for intensive instruction-by-instruction emulation, and for that reason no performance tests were run on it. It can be used as a VM, albeit a very slow one, but it's aimed at the nuts and bolts audience. Bochs also has support, however primitive, for simulating symmetric multiprocessing — something neither VMWare nor Virtual PC can do at this time.

Configuring a virtual machine in Bochs works one of two ways: either through a text-mode configuration program, or by creating and editing a text configuration file by hand. The user also needs to generate a hard disk image (courtesy of a supplied utility), and a CD/DVD-ROM can be emulated through a live device or an ISO image. If you're using Linux, you can even use a live disk partition as a disk image, but it's risky. The Bochs creators have also set up a series of disk images, running various "tiny" installations of open source OSes, that can be mounted and booted as is.

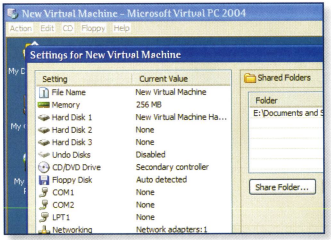
Because Bochs has been built with line-by-line emulation in mind, the number of options is extremely broad and highly technical. For instance, the way the emulated computer's realtime clock is managed can be changed depending on whether or not you need to have emulation running as close to full speed as possible, along with the number of emulated instructions per second.

One of the advantages of Bochs is that the system is totally open, including things like ROM images. Bochs comes with its own BIOS and VGA ROMs, but also allows the user to add support for their own ROM images or even custom ROM sets. This is a great way for a hardware engineer to emulate the functionality of a given ROM without having to test it physically.

Only Bochs was able to emulate two processors — but even then wasn't able to use a dual-processor system to emulate each processor separately.

Bochs performs far too slowly as a whole to allow satisfactory testing, but its creators make it clear that it's not intended for full-speed emulation.

Details	
Contact	Bochs IA-32 Emulator Project
Online	http://bochs.sourceforge.net
Price	Free
✔	Free; extremely configurable.
✖	Painfully slow.
Verdict	●●○○○



Microsoft Virtual PC 2004

Originally created by Connectix, Virtual PC was recently purchased by Microsoft. In its 2004 incarnation, it's not quite as powerful or flexible as VMWare, but it's still immensely useful.

Like VMWare, Virtual PC lets you create and manage virtual PCs through a central console and has a wizard interface for many common options (such as guest OS). The console is much more compact than VMWare, but it is also much less sophisticated. Both programs use the same trick for installing manufacturer-specific video and mouse drivers: the CD-ROM gets connected to an ISO disk image, which installs drivers automatically.

When you create a virtual machine, there's a cap on how much physical memory you can allocate: this is done to prevent the host malfunctioning. Virtual PC also supports suspending and resuming of VMs, so a machine's current state can simply be saved to disk. This saves time, since a resume is much faster than a reboot.

Some of the drawbacks of Virtual PC over VMWare are minor. Virtual PC only has a virtual IDE disk controller (VMWare also supports SCSI), and there's no emulation for hot-plugged USB devices. ISO images can't be used as a default CD-ROM device, but can be set up once a particular machine is created.

However, Virtual PC has some bonuses. It's got faster disk performance, and doesn't need separate drivers in the host OS for network connectivity. Also, the parallel and serial ports can be mapped to named pipes or text files (a very interesting touch, and something VMWare also supports in part), and specific actions can be scripted on the close of a virtual machine (suspend only, shut off, and so on).

VMWare's snapshot function is emulated via "undo disks", which allow you to selectively commit or undo changes made to a PC. Another nice feature is that the emulated machine's window can be resized to any dimensions without having to manually change the display.

It's also possible to lock the resolution and refresh rate of the emulated machine to that of the host, to prevent the display from changing dimensions automatically.

Details	
Contact	Microsoft
Phone	13 20 58
Online	www.microsoft.com/windowsxp/virtualpc
Price	$219 (Free upgrade from earlier versions of Connectix Virtual PC)
✔	Inexpensive; tight Windows integration.
✖	Not much emulated hardware.
Verdict	●●●●○

Bonus CD software
ActivePerl 5.8.2 build 808, Microsoft .NET Framework 1.1, Xarka OptiPerl, Macromedia Contribute 2, Dreamweaver MX 2004, HomeSite 5.5 and more.

Web authoring apps

Creating an effective Web page is not as difficult as you think. *Daniel Winter* tests 14 Web authoring applications to make your site stand out.

The Web is a big place, with an immense diversity of developers whose needs and skills stretch to the extremes. The range of Web authoring software can be visualised as a pyramid, with highly specific utilities (such as DHTML menu creators) residing at the base. At the summit are applications like enterprise-level programming environments. In between are the countless Web page editors and site builders which appear with almost monotonous regularity. To make things easier, we've selected two categories from the Web authoring software mix for cross-examination — server-side environments and HTML editors.

CLIENT/SERVER SUITES

The first collection of reviews are for Web technologies from the top of our software pyramid. These are either Web servers or server add-ons with programming languages that can be developed using conventional methodologies. To meet this requirement, either the language itself or the editing environment must support procedures like client and server debugging, stepping through code and application deployment strategies. Some of the applications reviewed in this category are borderline cases for the second category, as they encompass an integrated development environment, or IDE.

In the case of Visual Studio .NET and ColdFusion the distinction is clear: these are proprietary environments irrespective of the IDE software used in development. However, the others provide an IDE for third party or open source programming languages. Zend Development Environment, for instance, can be likened to an HTML editor with a PHP server plug-in — and PHP is an open source language. Conversely, BlueDragon is server software with no IDE but its sole purpose is to execute CFML — a programming language originating from Macromedia's proprietary ColdFusion server. Similarly, Pramati Server and Studio package uses Sun Microsystems' Java Framework as its technology, and OptiPerl works exclusively with the open source language Perl. Regardless, all of these applications were selected because they provide a programming methodology that's compatible with traditional programming structures.

How we tested

All server environments were installed on a Windows XP machine running both Apache and IIS Web servers. For testing browser output as well as remote debugging, another PC running Windows XP was used. Where possible, local debugging was tested in the IDE installed on the server. Usability issues such as ease of installation and configuration, as well as functional characteristics like database connectivity were evaluated and compared. This was performed with both MS SQL and MySQL servers, each running locally on the Web server.

Test dynamic Web pages were then viewed in a browser under each environment while monitoring factors like execution time, error handling, debugging and the level of IDE integration, where applicable. In the case of applications which worked with non-proprietary languages, the level of compatibility with the relevant technologies was investigated.

For HTML editors, features like code validation, code completion and syntax highlighting for a variety of languages were evaluated. The languages tested were ASP, HTML, JavaScript, PHP, JSP, CSS, XML, CFML and ASP.NET. The level of customisation available for the interface and keyboard shortcuts were taken into consideration.

Each program's ability to work seamlessly with both project managed sites, as well as ad hoc editing of pages was tested. Other concerns included the scope of the application for specialised tasks such as image and file editing, image mapping, style sheet editing, spellchecking and whether these were available natively or through integration with an external application. In the latter case, the seamlessness of that integration was assessed.

HTML EDITORS

The second round of reviews are for applications that are ostensibly referred to as HTML editors. Some of these provide WYSIWYG (What You See Is What You Get) design modes that minimise the need to work directly with code, while others are purely specialised text editors.

Beginner Web developers usually start in this category and work up to the more full-featured client/server suites depending on time, finances and demands. The level of control offered and relatively low price tag are the most compelling draw cards for the entry-level editors. Many experienced users will even finetune or hand-cut their code in a pure editor instead of relying on massive, client/server applications to optimise it for them. This behind-the-scenes access to the WYSIWYG design modes can help troubleshoot code errors or optimise pages for low-bandwidth delivery.

Many hardcore Web-development junkies claim Windows Notepad is the ultimate HTML editor, but there's a massive range of compelling editors on the market. Candidates for this category were selected for their ability to perform a wide range of editing tasks, preferably with some form of server integration or code validation features, but not necessarily so. What each developer prefers to use depends largely on personal choice, but the feature list of desirable or handy features in this class of products is universal. Of course HTML support was a requirement, but compatibility with other Web programming languages was also highly regarded. Some applications feature automatic indenting and colouring of code, while others offer basic site-management engines. The ability to integrate with other Web developing software was also a decisive factor, making this group of programs eligible for the title of best all-round HTML editor.

Zend Studio

PHP is arguably the most popular server language on the Web — and with good reason. It's a versatile, powerful and open source technology, and Zend Studio has made enterprise-level PHP application development a reality.

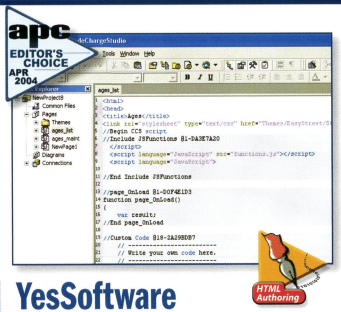
Zend Studio doesn't build on the PHP language; instead it offers access to server debugging via the code editor, complete with breakpoints, watches and debug messages. If you're installing Zend Studio Server on a new machine, it also offers to install the Apache Web server with PHP, saving extra downloads and installation time. Alternatively, it can configure itself to work with an existing IIS or Apache installation.

The server-side of Zend Studio is Web-configurable and provides access to PHP configuration as well as security, database and Apache server options. The Zend Studio Client controls the execution of PHP pages on the server, which passes runtime information back to the IDE for debugging and tuning application performance on the server. Configuring Visual Studio .NET to do thiswould normally be tricky, but the program does it automatically and by default. You could run PHP on the local machine for debugging code, but this isn't as reliable as using a staging or deployment server which emulates the live environment.

The Zend Studio interface is refined, with no screen space wasted on oversized buttons or bevelled edges — it's a coding environment with non-code elements kept to a bare minimum. All windows are collapsible and contain tabs for multiple views. Project management is available at the file level as well as via a function and constant browser. PHP functions are also readily accessible via the Explorer pane.

This program is a breeze to use — PHP coders should have it up and running in moments. It has FTP integration for deploying PHP apps, and CVS integration provides access to automated source control. Code is automatically indented as you type, with non-intrusive syntax highlighting, and all tasks are assigned to customisable shortcut keys. If all that isn't enough, application debugging is also available from within Internet Explorer using the Zend toolbar, further streamlining server and client application testing.

Details	
Contact	Zend
Online	www.zend.com
Price	US$195
✔	Advanced programming features.
✖	PHP is not a compiled language.
Verdict	●●●●◐



YesSoftware

CodeCharge Studio 2.2

CodeCharge Studio is an exceptional HTML editor. The application builder is superb, database connectivity is fully streamlined with dialog boxes and a step-by-step connection string builder automatically discovers network SQL servers. For administration pages, login information can be automatically validated against a database table, each of which can be assigned security levels for read and write access.

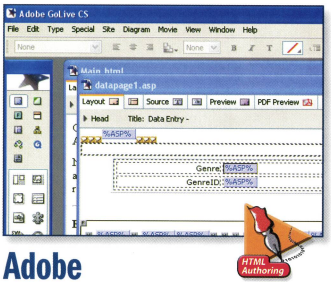
CodeCharge applications use a template paradigm similar to the code-behind concept in .NET, but it doesn't matter what server language you use — Perl, PHP, ASP, .NET or CFML. CodeCharge uses a custom page type with the extension CCP to store all the server-side code. When editing a CCP file, the interface provides the same Design, HTML and Preview modes found in other editors. The difference is that each CCP file is associated with an HTML file of the same name. The HTML file can be edited using CodeCharge or any other authoring package — extremely useful when a graphic designer and developer use different apps. This is similar to the Dreamweaver/FrontPage model except that there is no server-side code in the template.

Working with the generated code is simple. The property inspector and toolbox use the familiar WYSIWYG coding of Web Matrix, while the toolbar and browser utilise the simplicity of HomeSite.

Pages can be previewed either in the code window or an external browser. CodeCharge Studio generates the final server code and publishes the relevant files to the nominated location. Then it browses to the mapped URL with either the internal browser or a defined external browser. Adding and editing data-driven content can be done using the toolbox and property inspector as if working with regular visual controls. All the code is editable, so there's a perfect balance of control and automation. Custom code can be integrated easily without disrupting the design using server or client-side events, which are stored in a separate file.

CodeCharge Studio provides neat separation of presentation and business layers with the manageability of enterprise apps like Visual Studio. But it does it very economically in whatever programming language you fancy.

Details	
Contact	Saratoga Distribution
Phone	(08) 8410 6855
Online	www.saratoga.on.net
Price	$652
✔	Powerful application development.
✖	Enforces some programming rules.
Verdict	●●●●◐



Adobe

GoLive CS

Adobe's latest version of its Web authoring package boasts tighter integration with other Adobe applications like InDesign, Photoshop and ImageReady, although switching between apps still isn't as smooth as it could be. Even though GoLive can perform time-saving edits to PSD files directly, tasks such as importing from InDesign could have been streamlined. We also experienced some unexplained and non-repeatable crashes during testing.

Besides its comprehensive WYSIWYG design environment, GoLive incorporates some useful project management features, including support for a staging environment as well as version control. The version control features are provided by a new Adobe product called Version Cue, which is only available as part of the Adobe Creative Suite.

Version Cue works with the entire range of Adobe products. It's a bit like Source Safe for designers. While the program offers no server integration features, it's respectful of server-side code and leaves pages safely intact while modifying the HTML content. The script colour-coding is unexpectedly acceptable for PHP and ASP, although .NET pages were rendered almost entirely in red.

On the design side, inserting objects like Flash movies, QuickTime and images is straightforward. Acrobat and Photoshop files are also easy to work with, although the term "smart object" is used very loosely. For example, automatically converting making printable documents available as embedded PDFs to Acrobat format on publishing would have given Contribute's FlashPaper feature a real run for its money — especially combined with Adobe's Co-Author plug-in that enables content management zones to be specified within GoLive.

Considering the importance of Cascading Style Sheets (CSS) in contemporary sites, and the fact that few Web designers are familiar with hand-coding style sheets, Adobe has sensibly provided an intuitive and powerful CSS editing interface in GoLive. It occasionally crashed our program, but the CSS editor is as good as some dedicated applications, providing a comprehensive GUI as well as text-based CSS source code editing.

Details	
Contact	Adobe
Phone	1300 550 205
Online	www.adobe.com.au
Price	$889.90
✔	Great for page design and CSS.
✖	Not for application development.
Verdict	●●●○○

BlueDragon

Server 6.1

The suite of BlueDragon products all perform a common task — executing CFML code on a Java platform. Facing stiff competition from the ever-popular ColdFusion MX 6.1 this may seem a redundant product, but for one major different difference. BlueDragon Server is free — or at least there's a free version, and it's quite comprehensive. As BlueDragon's developer points out, the competition posed by .NET, ASP, PHP and JSP has squeezed CFML into a corner, partly as a result of Macromedia's pricing model. By using a free server or server add-on that parses CFML code, companies and developers which have invested a lot of time and effort in ColdFusion development can deploy their sites on Web servers that don't actually run Macromedia's ColdFusion server. Plus, they can do it on Mac, Windows or Linux.

Macromedia has raised the potential of CFML by rebuilding ColdFusion on the J2EE platform, but BlueDragon still offers a few draw cards. While the free version only supports ColdFusion 5.0 tags, the Server JX version is fully compatible with MX 6.1 tags — for half the price of Macromedia's version. BlueDragon for J2EE adds portable Java archives and compiled binary deployment.

Applications designed for ColdFusion 5 or earlier ran well on both the standalone and IIS versions of BlueDragon during testing, but the initial execution time was much longer than on the Macromedia server. Once the page was cached, however, the difference was negligible. The admin interface for BlueDragon is a clean but stripped back adaptation of the options found in the Macromedia version. Any ColdFusion user will find it familiar enough to use without manuals or help files. The automatic discovery and configuration of ODBC data sources is terrific, although the lack of native support for databases other that mySQL or Postgres is clearly where the compromise has been made.

While on one level BlueDragon is in direct competition with ColdFusion, it'll no doubt contribute to the longevity of CFML as a server technology. The .NET version of BlueDragon is due for release later this year.

Details	
Contact	New Atlanta
Online	www.newatlanta.com
Price	Server 6.1, Free; Server JX, US$549; J2EE Edition, US$2,499
✔	Good CFML compatibility; free.
✖	Not as fast as ColdFusion MX.
Verdict	●●●●○

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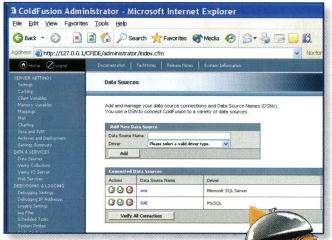

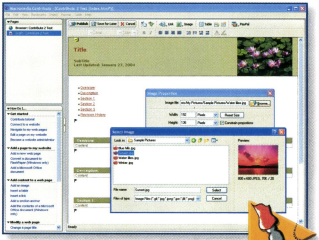

Macromedia

ColdFusion MX 6.1

ColdFusion is one of the most widely-used server technologies for the Web. Over time, the tag-based simplicity of the server-side language known as CFML (ColdFusion Markup Language) has been adapted to encompass script blocks, object-oriented programming (OOP) principles and other advanced programmatical structures. ColdFusion MX 6.1 is built entirely on the Java 2 Enterprise Edition (J2EE) platform, meaning that apps developed in CFML can be deployed on Macromedia's ColdFusion server as well as any J2EE-compliant server.

This is an important upgrade for ColdFusion, as it means CFML can be compiled into Java byte code, which drastically improves the server's performance, reliability, extensibility and cross-platform compatibility. By supporting compiled rather than interpreted code, the ColdFusion application architecture is on a level comparable to both .NET and conventional Java frameworks.

The improved mail handling and the CFINVOKE tag, which provides simplified connectivity to Web services, is particularly impressive. The admin is very slick, and the test CFML code runs as expected without errors. Connecting to data sources is straightforward for both SQL Server and mySQL.

CFML has always been a rapid development language. The downside to this user-friendliness is that CFML has little capacity for the code reusability of OOP languages. The move to Java and the introduction of ColdFusion Components (CFCs) means that CFML is now capable of object-oriented features like code modularisation, self-documentation and reusability.

XML handling has been improved, incorporating XSL transformations, document parsing and automated serialisation of data into XML. Although there is no single IDE for CFML comparable to VS.NET, ColdFusion capabilities are integrated into Macromedia's development tools (Dreamweaver and Flash). It's a clever strategy — keeping the designers and developers happy, while ensuring a robust enterprise platform for Web administrators and decision makers.

Details	
Contact	Macromedia
Phone	1800 001 014
Online	www.macromedia.com/ap
Price	$2,045
✔	Rapid application development.
✖	Expensive.
Verdict	●●●●○

Macromedia

Contribute 2

The second generation of Macromedia's streamlined content management application adds extra convenience for non-technical users and better Dreamweaver integration for developers. Firstly, a technology Macromedia calls FlashPaper allows any printable document to be automatically embedded in a Web page as a Flash file. While only available on the Windows version, this is similar to the functionality Adobe intended for its Acrobat PDF format. The PayPal plug-in, which helps automate a simple ecommerce application using the PayPal credit card payment service, is another handy addition.

While not supporting any server-side technologies per se, Contribute is designed to transparently work with files which use server scripting. Contribute 2 successfully completes all tests with ASP, JavaScript, CFML and PHP without any scripts being broken. Instead, blocks of server code are identified in the WYSIWYG editing window by small icons. For advanced users, the safety switch can be disabled, providing access to source code if necessary. Access can also be restricted to certain users along with other editing permissions. The security model is well-suited to sites that require content management but not an approval process. Users can belong to groups, which are in turn assigned to pages or folders they can edit. Extra permissions provide restrictions on page deletion and creation. Multiple copies of edits can be kept for rollback purposes and Dreamweaver templates can be used to restrict editable regions on a page.

Contribute 2 makes content management a breeze for non-technical users. It's designed to integrate seamlessly with Macromedia's other products — namely Dreamweaver and Flash — but is just as compatible with any server or authoring environments. Working with images, documents and HTML is straightforward, but forget about trying to write code in Contribute, it just won't happen — and that includes CSS positioning.

Contribute 2 is more like a Web-enabled groupware word processor than an authoring tool, but it fills a very large niche like no other.

Details	
Contact	Macromedia
Phone	1800 001 014
Online	www.macromedia.com/ap
Price	$160
✔	Inexpensive and easy to use.
✖	Not for sophisticated sites.
Verdict	●●●●○

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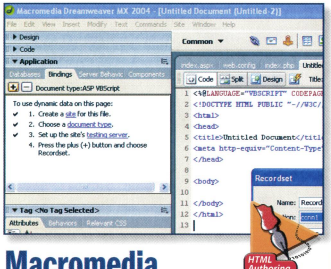

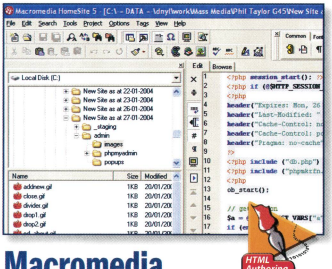

Macromedia
Dreamweaver MX 2004

Dreamweaver MX 2004 introduces yet another design makeover. It's an improvement — the toolbar is lean and the inspector windows are both minimal and detachable. Aside from the GUI, there's a greater level of control over CSS positioning. Although the use of HTML tables is fully supported, MX 2004 provides quick access to the CSS properties of any tag, complete with any class inheritance information. Not only does this cater for pixel-accurate positioning of HTML elements, it also takes the guesswork out of tweaking style sheets.

The versatile CSS positioning controls make the existing WYSIWYG design mode of Dreamweaver even more accurate and usable than with HTML tables. It's this seamless integration with Web technologies that partly explains the popularity of Dreamweaver.

Extending this integration to server technologies, the GUI makes working with PHP, ASP, CFML, .NET and JSP almost completely transparent to the user. Should you need to delve into server code, Dreamweaver doesn't attempt to shelter you from editing the source either. Whether PHP, ASP, CFML, JSP or .NET is selected as a server technology, the process of creating database connections and inserting dynamic HTML on pages is virtually identical. The resulting code is, in all cases, very tidy, easy to navigate and executes without a hitch.

Working with pages and sites in Dreamweaver MX 2004 is a lot less troublesome than in previous versions, although opening and saving pages is slower than expected. When new pages are created, they can be assigned to existing sites or edited on an ad hoc basis. Using the application utilities such as data binding, however, requires that a site be defined — even if it's just for the one page. Deployment options are flexible with local, testing and deployment options available that support both LAN and FTP connections where required.

Overall, the new Dreamweaver manages to cater to a broad Web developer audience and provides some nice GUI utilities, but it does so without shying away from source code and server technologies.

Details	
Contact	Macromedia
Phone	1800 001 014
Online	www.macromedia.com/ap
Price	$630
✔	Excellent CSS and compatibility.
✖	Slow when working with remote files.
Verdict	●●●●○

Macromedia
HomeSite 5.5

HomeSite is arguably the ultimate Web coding application. Its interface is possibly the most emulated in the business and the language support is excellent. Predefined toolbars for JavaScript, CFML, ASP, PHP and JSP are all standard for easy access to common programming tasks. Colour-coding is excellent and fully customisable. Project management is available which includes site mapping and link validation, but ad hoc editing is just as easy. Custom code snippets can be assigned to keyboard shortcuts for quick coding and macros have been introduced for even more automation power.

There's no doubt that HomeSite's success is partially due to its simplicity. One of the most useful interface features is the inclusion of two independent file browsers. Web developers who work on multiple sites or locations simultaneously will appreciate this simple device. The extended search and replace is possibly the best available, supporting regular expressions and the ignoring of HTML tags. The code optimisation performed by the integrated CodeSweeper is very thorough: different settings are configurable for different needs and languages. Built-in spellchecking, thumbnail browsing and image mapping also make life easier. Integration with external editors such as Dreamweaver and TopStyle for CSS also streamlines development by allowing these specialised programs to do their own thing.

HomeSite manages deployment of large and small sites by allowing multiple servers to be configured using standard or secure FTP. Custom upload scripts can then be used to define how files are deployed to each server. Team development is further supported with source control integration available for a nominated application like Source Safe. Unlike earlier versions of Dreamweaver, HomeSite's source control compatibility is seamless and, in some cases, faster than Microsoft's implementation.

Despite its popularity, there is concern among developers that HomeSite will fall by the wayside as Macromedia pumps everything into Dreamweaver. If so, one can only hope that all the things that make HomeSite so good are assimilated along the way.

Details	
Contact	Macromedia
Phone	1800 001 014
Online	www.macromedia.com/ap
Price	$160
✔	Excellent usability and interface.
✖	No WYSIWYG editing or wizards.
Verdict	●●●●○

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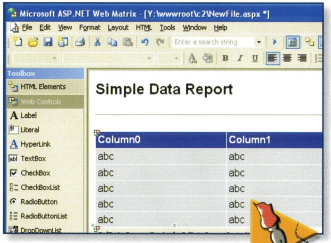

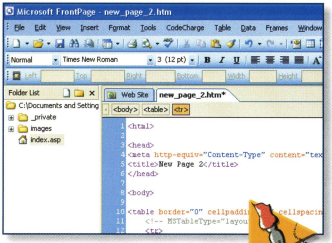

Microsoft

ASP.NET Web Matrix

ASP.NET is certainly an unusual product. For starters, it's a Microsoft freebie and, like Internet Explorer, is presumably being given away in an attempt to dominate the market. In this case, the market space is Web server technology. The .NET framework, like all of Microsoft's Web server versions, is also available for free. We can only assume that Microsoft intends to get users hooked on writing .NET code with Web Matrix and then up-sell them to the Visual Studio .NET suite, which is anything but free.

Web Matrix provides a handful of very useful templates which throw you right in the deep end of .NET… and leave you there. There's none of the hand-holding found in FrontPage and little of the developer help available in almost all the competing packages. Code mode is just a glorified text editor — and not that far from the Notepad genre either — just add a little colour-coding. In Design mode, however, quite a few conveniences are at hand. The standard properties window with Visual Studio-style options selection and help tips is available, and a toolbox of Web controls, HTML elements and custom snippets is also close by.

With a .NET workbook and plenty of spare time on your hands, Web Matrix will indeed give you a taste of .NET for free and leave you wanting more. Don't bother using it for CSS files, standard ASP or any other server languages — it'll revert to being a heavy Notepad replacement.

It's also important to note that, unlike the code generated by VS.NET, ASP.NET Web Matrix stores all your code-behind in the header of the aspx page. This not only limits you to VBScript (no C# or J# integration here), but it also undoes many of the benefits to be gained from conventional .NET development. For starters, the separation of presentation and business layers is blurred, plus the code won't be pre-compiled into DLL files in the way VS.NET permits.

As a pure HTML editor, though, its WYSIWYG capabilities do pack a punch — and as such the .NET aspect can just be considered a bonus.

Details	
Contact	Microsoft
Phone	13 20 58
Online	www.asp.net
Price	Free
✔	Free and lean.
✖	Provides little assistance with code.
Verdict	●●●◐○

Microsoft

Office FrontPage 2003

FrontPage has traditionally been the HTML editor for complete novices, as it shielded users from any frightening code. For FrontPage 2003, Microsoft has added an age-old HTML editing concept — the split view. The new coding emphasis is backed up by auto-completion for HTML, CSS, VBScript, .NET and JavaScript code. As good as they are, the new features may have you thinking you're using a *Twilight Zone* version of Dreamweaver. For example, convenient JavaScript behaviours can be applied to objects on the page, and the Dynamic Web Template (DWT) format could be confused with Dreamweaver's Template files, which use almost identical syntax.

Creating new pages and working within a FrontPage site is fairly straightforward, although it gets complicated when working with server scripting. Colour-coding is awful for server-side scripts, although adequate for client-side code including JScript and VBScript. Colour-coding for CSS files is non-existent, so presumably Microsoft intends you to use its Word-style CSS editor, which isn't really up to the task.

Although FrontPage is primarily designed to be a WYSIWYG editor, the code view really doesn't provide much for either the beginner or the experienced user. If anything, it confuses the situation. The HTML optimiser that's provided as part of the publish process is a nice idea, but not much more. Compared to the CodeSweeper in HomeSite or the Word HTML cleaner in Dreamweaver, for instance, it's a joke.

From the designer's perspective, FrontPage doesn't integrate well with other applications. It really is intended to be a Word replacement for simple Web pages. It does fill a need for the non-technical user, and the features are there. The Table layout templates are great for getting a page started quickly, and some of the wizards are actually very useful. The photo gallery, for instance, can extract photos from a digital camera or disk and create a page complete with thumbnails and comments in almost no time.

While it's no match for a database-driven gallery, it's a lot easier to create and presents the average Microsoft Office user with a familiar process to do so.

Details	
Contact	Microsoft
Phone	13 20 58
Online	www.microsoft.com.au
Price	$369
✔	Integrates well with Microsoft Office.
✖	Code editing is insufficient.
Verdict	●●●○○

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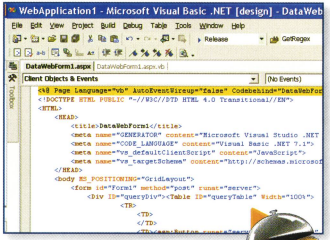

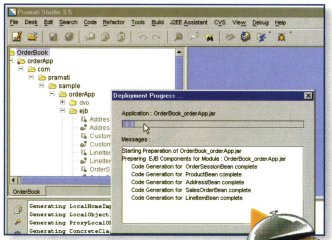

Microsoft

Visual Studio .NET 2003

At a whopping 3.5GB, Visual Studio .NET (VS.NET) is possibly the largest application ever released. It combines Visual Basic, Visual C++, Visual InterDev and Visual J++ as well C#. Despite the daunting task of working with such an all-encompassing environment, it's remarkably easy to use — once you get over the steep learning curve. Some experience with prior versions of Microsoft's IDEs and a bit of grounding in .NET are prerequisites to a smooth experience.

Common tasks such as creating master/detail pages and connecting to databases can largely be taken care of with wizards and drag-and-drop controls, but you won't get far by relying on these visual tools. The code-behind pages do all the application work and these take some getting used to.

Intelligent code prompting, code completion and automatic formatting make source code editing faster than ever. The new event-based architecture brings Web programming into line with conventional programming models and provides a satisfying separation of business logic from the presentation layer.

Event handlers can be written in the code-behind in over 20 supported programming languages, as well as via the .NET Common Runtime Library (CRL), COBOL and Fortran. XML is also thoroughly covered with full schema support and SOAP compatibility. In fact, any declared method can be automatically exposed via WSDL and SOAP simply by flagging it as a Web method.

Debugging applications in VS.NET is relatively painless. Advanced exception handling is supported and breakpoints can be set within the IDE for stepping through code while watching events and parameters. Debug information is available in a browser view, with a section dedicated to the trace information that won't interfere with the document's HTML.

VS.NET is stunning in its potential but can be intimidating, even for experienced Web developers. For enterprise Web applications requiring team development, source control, modularisation and source code security, it's hard to beat.

Details	
Contact	Microsoft
Phone	13 20 58
Online	www.microsoft.com.au
Price	Free; Professional Edition, $1,882
✔	Powerful and comprehensive IDE.
✖	Steep learning curve.
Verdict	●●●●○

Pramati

Server 3.5

Pramati is a full-featured J2EE Web server with integrated IDE (Pramati Studio). It offers code-free migration of apps already deployed on Apache, Tomcat, IIS and Weblogic servers. Hot manageability without server restarts will appeal to administrators, while rollback to earlier versions will tempt developers. The ability to distribute client JARs offline before deploying server-side applications is another highlight.

The automatic redeployment of existing apps is backed up by Pramati's ability to automatically configure itself based on the settings of the existing server environment. Application performance can be monitored in real time, and tweaked via a Web-based management console or XML-compliant interface. Integrated shielding against denial of service attacks is included for extra reliability, and document caching is completely configurable for performance tuning.

Pramati Studio makes developing server apps as straightforward as client-side ones. The editor is fully customisable, so code completion, formatting and validation rules can be engineered to suit your development style. Java source code can be browsed by the file system or using the object hierarchy. JavaDoc stubs are automatically created.

If packages, classes, methods or fields are renamed, for example, referenced code is automatically updated, validated and ready for deployment without specific debugging. When you do need to debug, the process is streamlined by conditional breakpoints and exception handling. Unit testing is available using integrated access to the JUnit and Cactus frameworks. Application architecture is managed by importing standard UML diagrams from ArgoUML or Rose.

It takes some time to get Pramati working properly. Once configured correctly, however, deploying existing JSP applications doesn't require any extra code or specialised configuration.

The IDE may be used as a standalone editor, but really comes into its own when coordinated with the server for testing and debugging. Using another IDE with the server is also feasible, but with the extra features available, we suggest using them in tandem.

Details	
Contact	MicroWay
Phone	1300 553 313
Online	www.microway.com.au
Price	Studio Web Edition, $362; Server Standard Edition, $660
✔	Integrated Java and JSP development.
✖	Not for the beginner.
Verdict	●●●○○

priced to mesmerise

The ASUS A25H is a notebook that will mesmerise you. Firstly it is pack with a full list of practical features at a great price. But that's not all. Whether you are in a business conference or relaxing at a café, the A25H is your reliable and robust companion.

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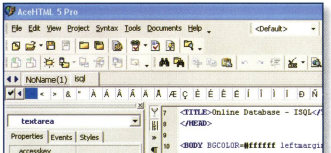

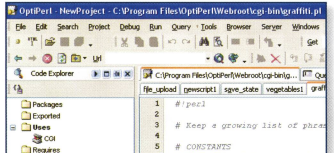

Visicom Media

AceHTML 5 Pro

AceHTML is primarily a text editor with some HTML shortcuts. In many ways, it's derivative of the interface popularised by HomeSite, with a tabbed window on the left for common tasks such as file browsing and tag inspection. The toolbars are lean and allow for customisation, although the vast majority of default buttons are for embedding objects in the page rather than working with any server-side tasks.

HTML is the dominant language supported, but access to ASP and PHP functions is available via pop-up reference windows. This is an interesting approach to incorporating easy-to-use server functions, but has the feeling of being tacked on rather than integrated into the editing environment. Once the pop-up window closes and the server code is on the page, there's no way of accessing a GUI editing window as found in HomeSite, Dreamweaver or ASP.NET Web Matrix, for instance.

With the exception of conventional ASP, no server-side languages are considered worthy of syntax highlighting. There is support for external code parsers for both PHP and Perl, which is a nice touch. Colour-coding defaults were hard on the eyes, with a lot of primary colours and bold text in use, but this is reconfigured easily enough. The code optimiser is fairly impressive with an unusual number of customisation options available. The code tips and property inspector are user-friendly with quick access to event scripting and style sheet variables. Conversely, the style sheet editor is a little lightweight.

In perspective, this is the cheapest of the editors reviewed and it caters to Web developers who need more control than FrontPage offers, but aren't using large server-side applications which require the more advanced features of Dreamweaver, HomeSite or Web Matrix. It's a powerful HTML editor for people willing to experiment with scripting and don't mind getting a bit of code on their hands.

A stripped-down free version is available that's sufficient for those prepared to hand-code without spellchecking, tag insight and all the extra usability features found in the full version.

Details	
Contact	Visicom Media
Online	www.visicommedia.com
Price	US$49.95
✔	Good for HTML and JavaScript.
✖	Default syntax highlighting is poor.
Verdict	●●●●○

Xarka

OptiPerl 4.3

As the predecessor to ASP, PHP and ColdFusion, Perl is starting to show its age, but as a tried and tested technology, there are some awesome development tools available. Perl runs on virtually any Web server on any platform, and runtime is free. However, it was never really designed to be an enterprise-level programming language. Xarka provides an IDE which elevates the possibilities — if not the capabilities — of large-scale application development with Perl.

The OptiPerl interface is different to standard IDE conventions. The code explorer and object browser defaults to the left-hand side above the project explorer; and there are two vertical edit regions rather than the horizontal layout common in split view editors. Fortunately, all of this is customisable with drag-and-drop window reorganisation.

Debugging is primarily done client-side, which offers the advantage of being offline, but remote debugging is also possible if the server is configured correctly. OptiPerl automatically makes the registry settings on Windows machines on a LAN, but there are clear instructions on how to do this manually for other OSes. The debugger then executes the remote script in the browser window, which automatically correlates breakpoints from the local file. This is a neat way of faking an integrated programming environment and even permits stepping through code while watching variables.

Though unusual, the editing environment is very tidy. All functions and subroutines are colour-coded and collapsible, making navigating large scripts easy. Arrays, scalar variables and the like are accessible from the code explorer in a hierarchical tree view. Sending lists of get, post, cookie and other environment options to the debugging browser window makes testing a breeze. Comprehensive deployment settings include options like firewall configuration and session states for remote testing.

OptiPerl takes a lot of the frustration out of coding in Perl. There are no wizards or database GUIs as found in other IDEs, but the sample source code in the help files is more than adequate.

Details	
Contact	Xarka Software
Online	www.xarka.com
Price	Standard, US$39; Commercial, US$259
✔	Inexpensive and powerful.
✖	Limited application scope.
Verdict	●●●●○

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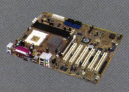
A7V600



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17in TFT monitors

LCDs use less desk space, are cheaper to run and easier on the eyes than CRTs. *Jarrod Spiga* puts 15 17in TFT monitors to the test.

According to a number of sources, the 2003 Christmas period was a boom time for LCD manufacturers. Sales of 17in models in particular went through the roof, and many vendors were caught off guard forced to push some next-generation lines through to market to keep up with demand.

Prices on these screens have dramatically decreased due to improvements in the fabrication of the silica substrate used in their production. Refresh rates as low as 12ms are appearing on some models. Contrast ratios of up to 500:1 are producing better tone definition and picture quality. And luminance ratings up to 300 candelas per square metre (cd/m²) allow these screens to be used just about anywhere.

TFTs take up little desk space, and consume around half power of a conventional CRT. However, many negative points still remain. After shelling out almost $1,000 for your new display, the last thing you want to see a stuck white pixel. Some faulty product ("dead pixel") policies will leave you thinking there's light at the end of the tunnel, while others consider that the existence of a few dead pixels is acceptable and force you to put up with the defect. We've attempted to explain these policies in more detail here due to the large number of people concerned about this issue.

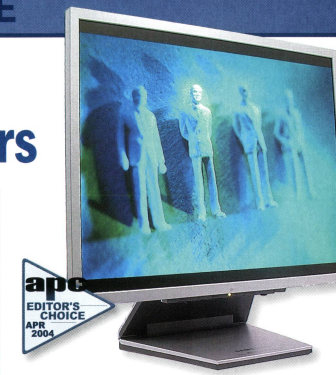
There are a few vendors missing from this line-up: some couldn't come to the party due to stock issues, while others couldn't submit next-generation lines in time. Others, such as AG Neovo, refused to submit product to us, citing bad reviews in the past as justification. We'll leave it to you to decide what to make of AG Neovo's lack of confidence in its own product.

How we tested

All LCD panels were connected to the same test bench, consisting of a Pentium 4 3.2GHz CPU, 512MB DDR, and an ATI Radeon 9800 Pro graphics card. Each panel was connected to the AGP card via the D-sub cable which shipped with the monitor (since we were unable to use the same cable on all screens — the ViewSonic panel had a permanent cable).

All screens were tested using DisplayMate Multimedia edition. Brightness, contrast, pixel tracking, colour intensity, shadowing, gamma, bandwidth index, streaking and dead pixel tests were focused on, but other tests were used to ensure that the screens were configured optimally. A comprehensive run-down of the tests and their implications on image quality can be found at *www.displaymate.com/crt_test.html*.

To test the effects of ghosting, we ran the game tests in 3DMark2001 plus a few rounds of Quake III Arena.



Samsung SyncMaster 172x

Samsung's LCDs are one step ahead of the competition. The 172x has a ultra-narrow bezel, a slim design (perfect for multi-display setups), and a 12ms refresh rate which makes fast-motion video look as crisp as on conventional CRT screens.

The 500:1 contrast ratio makes it easy to differentiate between slight variances in tone than on screens with lower ratios. We got a perfect gamma measurement of 2.2, ensuring that even mid-tones appear exactly as they should. The panel is cheaper to run in the long term, as it only draws 40W of power, almost 20% less than almost all others in the roundup.

Obtaining the almost-perfect bandwidth index of 100.4, a very small shadow does appear to the right of light blocks on a dark grey background. Some screens have sharpness controls to reduce the effect by blurring the edges slightly, but this unit doesn't.

The D-sub cable and plugs are of superior quality, even if they do protrude from the base's rear and take up more desk space than the bare footprint would. This can be overcome by wall-mounting the monitor using the supplied bracket. Bolt it to the wall, clip the base on, and the cables are neatly hidden behind the display panel.

The dual-hinge design holds advantages over other screens as it allows you to adjust the height as well as the display angle, whether it's hanging on a wall or sitting on your desk.

Samsung will replace the screen if you see one dead pixel within seven days of purchase. After that, if a faulty subpixel appears in an 8cm square in the centre of the panel, or if three faulty subpixels appear outside this area, a replacement is warranted within its three-year warranty period. This period also includes the panel's backlight.

Details

Contact	Samsung
Phone	(02) 9763 9700
Online	www.samsung.com.au
Price	$1,099
Dead Pixel Policy	Replace when > 0 subpixels faulty in first 7 days. Thereafter, replace when > 0 subpixels faulty in centre, or when > 2 subpixels faulty around edge.
✔	Refresh rate; contrast ratio; power consumption.
✖	Footprint.
Verdict	●●●●◐

AOC LM729

AOC's LM729 is unique in that the screen can be rotated 90° for portrait orientation. While there are no controls to rotate your displayed image, many display drivers will do the job. When the monitor is rotated though, you don't get the sense of stereo from the built-in speakers.

In addition to panel rotation, the base swivels through 70°, and can be tilted 25°. The screen rotation function gives explanation to the design of the telescopic height-adjustment pole — a design that sees the screen shake every time it's bumped.

The 25ms refresh rate shows a fair amount of ghosting, so gamers may want to pass on this model, even though 16 million colours are supported. Brightness controls do next to nothing, but the contrast controls are great and the screen's anti-glare coating does a fine job in bright environments. During testing, some beat patterns appear on dithered patterns and slight streaks are also visible.

Our test sample had one blue subpixel stuck on, within 2.5cm from the bottom of the screen. AOC's dead pixel policy states that we'd need another two pixels to be stuck on before this panel could be swapped, so this has to be tolerated.

The AOC LM729 is certainly flexible, but the tech specs let it down.

Details

Contact	AOC
Phone	(02) 9403 5780
Online	www.anz.aocmonitor.com
Price	$899
Dead Pixel Policy	Replace when > 3 subpixels stuck on, when > 3 subpixels stuck off, when > 0 clusters of 3 adjacent subpixels stuck off, or when > 5 subpixels faulty.
✔	Positioning freedom; screen rotation.
✖	Refresh rate.
Verdict	●●◐○○

AOpen F75PS

The AOpen F75PS ships with the base separated from the panel, but DIY assembly of the compact unit is child's play.

While the D-sub, RCA audio and power plugs jut out from the screen, the cables have been cleverly designed with 90° plugs, allowing for efficient cable routing and use of minimal space. This design has also forced the power supply outside of the monitor.

The most evident problem in testing is the replication of darker tones. In fact, when displaying 256 tones between black and white, it's almost impossible to differentiate the darkest 12 tones from black. Adjusting the contrast and brightness controls has little effect in improving the situation.

Beat patterns also appear in some dithered blocks. Adjusting the screen's phase eliminated these, only to display them again in a different block. The high bandwidth index of 108.9 can be attributed towards the cable design. The menu options in the onscreen display are arranged in a circular order, which makes using controls (labelled up and down) very difficult.

On a more positive note, this screen exhibits minimal amounts of glare and reflection, and streaking effects are kept to a minimum. The effects of ghosting are rarely seen, even though the screen features a 262,000 colour palette.

Details

Contact	Bluechip IT
Phone	1800 803 802
Online	www.bluechipit.com.au
Price	$749
Dead Pixel Policy	Replace when > 3 subpixels stuck on, when > 3 subpixels stuck off, or when > 7 subpixels faulty.
✔	Compact design.
✖	Dark tones indistinguishable; confusing OSD.
Verdict	●●○○○

BenQ FP767

From the box, the base needs to be snapped on and its sturdy attachments match its chunky look. This rigidity is also reflected in the hinge — the panel can only be tilted between 25° and perpendicular.

D-sub, power and audio cables plug in parallel with the panel, allowing for space-saving cable routing. A headphone jack on the side of the screen complements the stereo speakers.

The observed contrast range in the FP767 is better than any other screen in this roundup. This could partly be attributed to the impressive 500:1 contrast ratio. The gamma reading is an impressive 2.2. However, the corners of the screen don't appear as intensely lit as the centre, giving different replication of colour in different areas of the screen. There's also a greater than normal presence of streaking in high-contrast areas. The sharpness controls don't seem to do anything at all, and the OSD is also a little slow to respond overall.

BenQ's dead pixel policy is complicated. Basically, divide the screen's height and width into thirds. If a subpixel is permanently lit in the centre area, a replacement is yours. Alternatively, BenQ will swap your screen if four always-lit subpixels appear across the entire screen. Having five dead (unlit) subpixels also warrants a replacement.

Details

Contact	BenQ
Phone	(02) 9714 6800
Online	www.benq.com.au
Price	$899
Dead Pixel Policy	Replace when > 0 subpixels stuck on in centre, when > 3 subpixels stuck on, or when > 4 subpixels stuck off.
✔	Great contrast performance.
✖	Minor brightness and streaking issues; chunky.
Verdict	●●●◐○

CMV CT-723A

CMV's zero-tolerance policy on pixel faults and its $799 price tag put the CT7-23A just a shade away from the Editor's Choice. Amazingly, as soon as one element on the screen becomes faulty under warranty, the monitor can be replaced.

Displayed images are excellent. The 400:1 contrast ratio shows great tone definition, and a brightness rating of 400cd/m² means you can use the screen in all but the brightest environments. Levels of reflection and glare are also acceptable.

Light objects on dark backgrounds generate minor streaking, and the sharpness controls aren't as responsive as other panels. Pixel tracking can be seen in some dithered patterns, but it can be eliminated using the phase settings in the OSD.

Its design is well thought out, but it won't appeal to everyone. The base folds flush to the back of the screen, and the cables plug vertically into the screen, allowing it to be wall-mounted. This design is also beneficial to desktop users who want the flexibility to view the monitor at different vertical angles.

Since our previous review (*APC* February, page 56), $100 has been knocked off the price. And considering that the CT-723A also has a three-year, onsite warranty, this monitor's hard to go past.

Details

Contact	Impact Systems
Phone	(02) 9621 2999
Online	www.impactsystems.com.au
Price	$799
Dead Pixel Policy	Replace when > 0 subpixels faulty.
✔	Great image; dead pixel policy.
✖	Minor streaking.
Verdict	●●●●○

EIZO FlexScan L550

EIZO's FlexScan L550 has two outstanding features. The first is the stand, which resembles an ironing board, right down to the wheels on the back support. This allows the screen to be pitched at angles of up to 35°.

The second is the BrightRegulator, a sensor which detects the surrounding brightness and auto-adjusts the screen to suit the environment. It's a clever feature which EIZO claims reduces eyestrain.

The brightness regulator does a good job overall, but in situations where the contrast makes it difficult to see certain tones, there's no easy way to manually adjust the settings. Instead, you have to fiddle with the colour controls.

This results in washed out colours and tones approaching white, producing similar results to a panel sporting a 400:1 contrast ratio instead of a 450:1 ratio.

The FlexScan L550 has a true colour palette and a typical refresh rate of 16ms. This is enough to prevent ghosting in almost all applications including gameplay.

The unit is covered by a five-year limited warranty, though the backlight is only covered for the first three. EIZO's dead pixel policy specifies that a replacement will be made when there are two clustered faulty pixels.

Details

Contact	Arcadia
Phone	(02) 9239 1517
Online	www.eizo.com.au
Price	$890
Dead Pixel Policy	Replace when > 1 cluster of 2 adjacent subpixels faulty.
✔	BrightRegulator feature; warranty period.
✖	No contrast control; saturation issues.
Verdict	●●◐○○

Gigabyte GD-1703BP

Gigabyte's screen looks identical to the AOpen F75PS, so what's the difference? Well for starters, AOpen claims its screen has a brightness rating of 260cd/m², whereas Gigabyte's is 250cd/m². Gigabyte's panel also uses 2W stereo speakers, twice the power of AOpen's. However, these differences don't improve its functionality or image quality.

Our test unit had a peculiar pixel malfunction — green when it should be off, off when it should be green, and red when it should be white. Sadly, Gigabyte's dead pixel policy means you'd be stuck with this problem.

Apart from that, there's little to separate this monitor from the AOpen: both have equally poor tone definition and show beat patterns on the same dithered blocks after auto-adjustment calibration.

The same shadowing effects appear as a result of the cable design unique to these monitors. It's also a shame the company didn't go to the trouble of labelling the OSD controls in a more logical manner, instead of just printing the Gigabyte brand on the front.

This monitor would probably only be considered by those on a tight budget, particularly if they aren't using it much.

Details

Contact	Rectron
Phone	(02) 9748 7725
Online	www.rectron.com.au
Price	$639
Dead Pixel Policy	Replace when > 2 subpixels stuck on, when > 2 subpixels stuck off, or when > 4 subpixels faulty.
✔	Compact design; price.
✖	Dark tones indistinguishable; confusing OSD .
Verdict	●●◐○○

Hyundai ImageQuest Q17A

The ImageQuest Q17A is the younger brother of the ImageQuest Q17 (reviewed *APC* September 2003, page 64). The newer model features an improved 500:1 contrast ratio, allowing differentiation between all but two of the 256 shades of grey between black and white, and giving superb colour reproduction near white. It's just as well, as the brightness and contrast controls on the semi-transparent OSD aren't very effective.

Our sample screen displayed hue colours more brightly than others, but this could be adjusted in the OSD. We also observed occasional ghosting during action games — odd for a screen that supposedly has a 16ms refresh rate.

Almost all other specs remain the same. The multimedia base sports a two-port USB hub, a headphone jack and speakers.

The dual-hinge design gives great flexibility in adjusting the viewing angle, and allows wall-mounting via an optional VESA-compliant bracket. The only negative aspect about the design is that D-sub, DVI, audio and power cables protrude from the back of the base. If placed on a desk, additional space is consumed due to this. If the monitor is wall-mounted, the cables will be visible above the top of the screen.

Details

Contact	Synnex
Phone	1300 880 038
Online	www.synnex.com.au
Price	$859
Dead Pixel Policy	Replace when > 4 subpixels faulty, or when > 1 subpixel faulty separated by less than 10mm.
✔	Multimedia base; wall-mountable.
✖	Cable layout; some ghosting.
Verdict	●●●○○

IBM ThinkVision 170P

The L170P has an outstanding 500:1 contrast ratio, making it easy to distinguish between similar shades on the screen, and stops near-white colours from being saturated. There's no sign of beat patterns, timing locks or any other phase-related issues, and gamma was measured at an almost-perfect 2.3.

The bandwidth index came in at 102.4. Good quality cables and plugs ship with the screen, but as evidenced by the 100+ figure, some shadowing appears around high-contrast objects.

The base is built on a rotating disk that swivels through 135° in either direction. The height can be adjusted up to 10cm above a desk. Cables are routed down from the back of the screen, and can be managed neatly using the attached clips.

The 20ms refresh rate produces a fair amount of ghosting, reducing image quality when playing games or watching your favourite DVD. The other negative is the OSD. Granted, most users don't use them often, but it's far from intuitive.

The premium price may well put it out of reach for many home users, but this is one of the best for the workplace.

Details

Contact	IBM
Phone	13 24 26
Online	www.ibm.com/au
Price	$1,049
Dead Pixel Policy	Replace when > 0 clusters to 2 adjacent subpixels faulty, when > 3 subpixels stuck on, when > 3 subpixels stuck off, or when > 5 subpixels faulty.
✔	Panel positioning; contrast ratio.
✖	OSD; ghosting.
Verdict	●●●●○

Mitsubishi DiamondView DV175

Mitsubishi's DV175 is the only screen with OSD controls on its base. Instead of buttons, touch sensors determine which control you're adjusting. The only trouble is that they're a little too sensitive — your fingers can be 2cm above them, and the monitor thinks you're pressing them. There's no key-lock either, so it's easy to change settings by mistake.

The screen's hinge is very rigid, but you can bend the base through 90°. A VESA standard wall-mounting bracket is integrated into the base. Attached cables protrude from the back of the base, but they won't show over the top when hung on a wall.

Image quality is disappointing: shadows appeared to the right of light objects, and no adjustment of sharpness controls could resolve this. The bandwidth index we measured was low, indicating that the D-sub cable or plugs on the monitor are sub-standard.

Beat patterns appear on some dithered blocks, but manual adjustments to phase eliminated these. There is some ghosting, due to the 20ms refresh rate on the true colour palette.

Apart from that, contrast and brightness aspects are great. Gamma measures at 2.1, which is close to perfect. It also sports a DVI input and 1W stereo speakers.

Details

Contact	Mitsubishi Electric
Phone	(02) 9684 7777
Online	www.mitsubishi-electric.com.au
Price	$899
Dead Pixel Policy	Replace when > 3 subpixels stuck on, when > 3 subpixels stuck off, or when > 5 subpixels faulty.
✔	Brightness and contrast.
✖	Image quality; oversensitive controls.
Verdict	●●○○○

NEC 1760NX

NEC's 1760NX is an interesting blend of contrasts. Thin bezels normally look sleek, but this panel is far too chunky to give that impression.

Having the power transformer built into the panel is the root cause for this. At least the bulk allows cables to be plugged in vertically, minimising the desk real estate required.

The base rotates through 340°, the stand is height adjustable, and you have 45° of tilt to play with.

Performance is reasonable. Brightness and contrast are above average thanks to the 450:1 contrast ratio and 260cd/m² brightness rating, with good reproduction of tones near the black and white ends of greyscale. Colour reproduction near white isn't washed out, though hues appear brighter than other colours. A 16ms refresh rate minimises ghosting.

There's a little shadowing, almost certainly as a result of the bandwidth index, measured at 104.7. Adjusting the sharpness via the OSD normally fixes this, but there's no such control on this screen.

The OSD is illogical and difficult to use. The Exit button brings up a menu with a couple of options. Pressing Exit again will take you back to the main menu. Unfortunately, NEC has a potentially confusing dead pixel policy where claims are assessed case-by-case.

Details

Contact	NEC
Phone	13 16 32
Online	www.nec.com.au
Price	$999
Dead Pixel Policy	Replace on case-by-case basis.
✔	Image quality; screen positioning.
✖	Risky DPP; bulky; OSD.
Verdict	●●●○○

Panasonic TX-LCD17MSIL

Panasonic's submission is sleek and unique. The 2W stereo speakers are concealed behind the screen, strangely pointing away from the user.

The curved aluminium base is sturdier than it looks and makes the screen quite heavy — even with the transformer external to the monitor. But the design takes up surprisingly little desk space.

A 25ms refresh rate is responsible for the ghosting in action sequences. The phase controls in the OSD don't change much, but no pixel tracking or beat patterns in dithered blocks were observed. A gamma measurement of 1.8 explains our difficulties in distinguishing between darker shades of grey. The screen's brightness rating of 300cd/m² is one of the highest we've seen, and makes it suitable for use in all lighting conditions. There's no reflection of glare, even in the brightest locations.

Sharpness controls are very responsive. By setting them high, you can minimise ghosting at the cost of adding slight shadows to the edges of objects.

Our review unit had one pixel stuck on. Panasonic's dead pixel policy states that five pixels would have to be stuck on, or another eight would have to exhibit faults before the screen could be replaced. This policy is one of the worst in the roundup, so buyers beware.

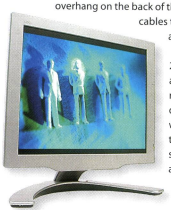
Details

Contact	Panasonic
Phone	(02) 9986 7400
Online	www.panasonic.com.au
Price	$961
Dead Pixel Policy	Replace when > 5 subpixels stuck on, when > 5 subpixels stuck off, or when > 8 subpixels faulty.
✔	Unique look; bright.
✖	Ghosting; contrast aspects.
Verdict	●●●●○

Philips 170C

The base of the 170C is certainly unique. It stops the panel from sliding around the desk, but it has a tendency to wobble when bumped.

The 170C has an internal transformer, and there's sufficient overhang on the back of the panel for the power and D-sub cables to hang downward and be tucked around the upright support.



Some ghosting appears due to the 25ms refresh rate, but it's not as bad as other 25ms TFTs. The 400:1 contrast ratio allows differentiation between darker shades of grey. This is justified with a gamma rating of 2.1. However, tones nearest to white are often saturated. Colour intensity is uniform across the screen, but blues are more intense than others.

The bandwidth index measures as 100.4, indicating that the cables and plugs are of good quality. As a result, no shadows appear around contrasting blocks. Much like the NEC screen, no sharpness controls exist to adjust this property if shadowing does appear.

Philips offers a "zero bright dot" guarantee on its LCD screens, where a bright dot refers to a white, fully on pixel. However, you'll need a total of eight permanently unlit or subpixel problems to get a replacement unit.

Details

Contact	Philips
Phone	(02) 9947 0000
Online	www.philips.com.au
Price	$999
Dead Pixel Policy	Replace when > 1 subpixels stuck on, or when > 7 subpixels faulty.
✔	Space saving; good contrast.
✖	Saturated light tones.
Verdict	●●●○○

Sony SDM-X73

The SDM-X73's stand is particularly interesting, slanting backward at an angle close to 60° from horizontal. The panel can slide up and down this support, giving you the ability to set the screen to a comfortable height. Cables from the dual D-sub and DVI ports are neatly tucked away behind a retractable panel and are clipped into place. Also featuring a 5–20° tilt and 360° swivel base, this TFT is also ideal for the office.

The SDM-X73 features a 16ms refresh rate. While this is still only adequate for gameplay, almost all fast video motion is displayed without ghosting.

The rated luminance of 300cd/m² caters for use in brightly lit locations. Unlike the other screens with similar luminance, the SDM-X73 doesn't saturate tones as they approach white and the colour reproduction at this level is impressive. The contrast ratio of 400:1 allows for reasonable differentiation between adjacent tones. A bandwidth index of 112.2 shows shadow on contrasting blocks, but the sharpness controls can blur these out. We also observed some very minor but incurable pixel tracking on the unit.

Peace of mind is also assured with a three-year warranty including a zero dead pixel guarantee — a factor that makes the high price a little easier to swallow.

Details

Contact	Sony Australia
Phone	1300 138 246
Online	www.sony.com.au
Price	$1,099
Dead Pixel Policy	Replace when > 0 subpixels faulty.
✔	DPP policy; white level performance.
✖	Price; shadowing.
Verdict	●●●●○

ViewSonic VA720

ViewSonic's VA720 consumes just 40W of power in operation. It also features a permanently attached, longer-than-average D-sub cable.

Despite the contrast ratio of 450:1, it's not easy to differentiate between similar shades of grey, even after manually optimising contrast and brightness. Also, there's noticeably more streaking than other screens in this roundup.

The measured bandwidth index is 103.5, but no shadowing appears. Colour intensities across the screen were pure, and pixel timing and beat pattern issues are non-existent, thanks to the nicely calibrated pixel phase controls.

The OSD is a tad confusing to use. There are standard up and down keys, but the other two — labelled 1 and 2 — have different functions depending on which menu you're in.

The base of the unit is huge, but very sturdy. The hinge allows the screen to be tilted back to horizontal, and supports the optional VESA wall-mount bracket.

While the screen is fairly mediocre, the dead pixel policy lets things down even further. The three-year warranty only grants you a replacement panel if eight or more pixels are faulty.

Details

Contact	Viewsonic
Phone	(02) 9906 6277
Online	www.viewsonic.com.au
Price	$899
Dead Pixel Policy	Replace when > 7 subpixels faulty.
✔	Power consumption.
✖	OSD; image quality.
Verdict	●●○○○

Pix your poison

Many prospective LCD buyers have concerns about dead pixels — with good reason. Purchasing panels from some vendors is akin to a game of Russian roulette. Getting the correct details of each dead pixel policy is a challenge in itself. Retail staff are often just as confused as you in regards to the matter, and when you add in confusion over the interpretation of definitions of pixel failures, it's no wonder some Return Materials Authorisations (RMAs) get knocked back when they shouldn't be, and vice versa.

The International Standards Organisation published ISO 13406-2, stipulating an array of ergonomic requirements on the quality of liquid crystal display images. This standard includes specifications on four classes of "acceptable" failure rates for subpixel elements. The trouble with this is that hardly any manufacturers stick to these defined classes, adopting their own policies instead.

Manufacturers such as CMV make it dead simple. Their policy states that if there's a single subpicture element that's not functioning correctly, you're entitled to a replacement screen. Samsung offers a similar policy provided that you observe the problem within seven days of purchase. After that, things get a little more complicated.

Many manufacturers have different policies for different types of faults. AOC has one of the better policies in this area, requiring you to have four subpixels stuck on or off for a replacement. However, if you have three stuck on and three stuck off, you won't be able to get a replacement screen unless another pixel dies.

Make sure you read the fine print too. Philips advertises a "zero bright dot" guarantee. It defines a bright dot as a pixel stuck fully on — that is, all three subpixels that make up that pixel need to be on. Otherwise, you'll need eight problems to put in a warranty claim.

The most risky policy is to have none. NEC states that it will "treat any pixel issues on a case-by-case basis". Of course, this could mean that one faulty subpixel is enough to warrant a replacement, but then again, it could mean something else entirely.

17in TFT monitors

Brand and model	AOC LM729	AOpen A75PS	BenQ FP767	CMV CT-723A	EIZO FlexScan L550	Gigabyte GD-1703BP	Hyundai ImageQuest Q17A
Pixel pitch (mm)	0.264	0.264	0.264	0.264	0.264	0.264	0.264
Brightness (cd/m²)	260	260	260	400	300	250	250
Contrast ratio	450:1	450:1	500:1	500:1	450:1	450:1	450:1
Response time (ms)	25	16	16	16	16	16	25
Colour palette	16.7 million	262,000	16.7 million	16.7 million	16.7 million	262,000	16.7 million
Connectors	D-sub	D-sub	D-sub	D-sub	D-sub	D-sub	D-sub
Power supply type/ consumption	Internal/45W	External/48W	Internal/50W	External/45W	Internal/38W	External/48W	Internal/45W
Speakers	2 x 2W	2 x 1W	2 x 1W	2 x 2.5W	N/A	2 x 2W	2 x 2W
Weight (kg)	5.9	5.2	4.5	4.2	3.9	5.2	4.8
Warranty	3 years on-site	3 years pickup	3 years pickup	3 years on-site	5 years (3 years on backlight)	3 years parts, 1 year panel	3 years on-site
Dead pixel policy	Replace when > 3 subpixels stuck on, when > 3 subpixels stuck off, when > 0 clusters of 3 adjacent subpixels stuck off, or when > 5 subpixels faulty	Replace when > 3 subpixels stuck on, when > 3 subpixels stuck off, or when > 7 subpixels faulty	Replace when > 0 subpixels stuck on in centre, when > 3 subpixels stuck on, or when > 4 subpixels stuck off	Replace when > 0 subpixels faulty	Replace when > 1 cluster of 2 adjacent subpixels faulty	Replace when > 2 subpixels stuck on, when > 2 subpixels stuck off, or when > 4 subpixels faulty	Replace when > 4 subpixels faulty, or when > 1 subpixel faulty separated by less than 10mm
Native resolution	1,280 x 1,024	1,280 x 1,024	1,280 x 1,024	1,280 x 1,024	1,280 x 1,024	1,280 x 1,024	1,280 x 1,024
Screen/base depth (mm)	176/226	93/153	152/188	167/212	106/106	93/153	206/248
Gamma	2.1	1.9	2.2	1.8	2.3	2.1	2.3
Bandwidth index	110.2	103.9	99.2	95.7	102.4	98.8	108.6
Price	$899	$749	$899	$799	$890	$639	$859

	IBM ThinkVision L170P	Mitsubishi DiamondView DV175	NEC 1760NX	Panasonic TX-LCD17MSIL	Philips 170C	Samsung SyncMaster 172x	Sony SDM-X73	ViewSonic VA720
	0.264	0.264	0.264	0.264	0.264	0.264	0.264	0.264
	250	250	260	250	250	270	300	250
	500:1	430:1	400:1	400:1	400:1	500:1	400:1	450:1
	25	20	16	25	25	12	16	25
	16.7 million	16.7 million	16.7 million	16.7 million	16.7 million	16.7 million	16.7 million	16.7 million
	D-sub, DVI	D-sub, DVI	D-sub, DVI	D-sub	D-sub	D-sub, DVI	2xD-sub, DVI	D-sub
	Internal/40W	External/48W	Internal/48W	External/48W	External/40W	External, 40W	Internal/45W	Internal/50W
	None	2 x 1W	None	2 x 2W	None	None	2 x 2W	None
	5.7	4.7	5	6.5	4.1	3.8	7.1	3.7
	3 years on-site	3 years on-site	3 years	3 years on-site	3 years	3 years	3 years	3 years
	Replace when > 0 clusters to 2 adjacent subpixels faulty, when > 3 subpixels stuck on, when > 3 subpixels stuck off, or when > 5 subpixels faulty	Replace when > 3 subpixels stuck on, when > 3 subpixels stuck off, or when > 5 subpixels faulty	Replace on case-by-case basis	Replace when > 5 subpixels stuck on, when > 5 subpixels stuck off, or when > 8 subpixels faulty	Replace when > 1 subpixel stuck on, or when > 7 subpixels faulty	Replace when > 0 subpixels faulty in first 7 days. Thereafter, replace when > 0 subpixels faulty in centre, or when > 2 subpixels faulty around edge	Replace when > 0 subpixels faulty	Replace when > 0 subpixels faulty for the first year
	1,280 x 1,024	1,280 x 1,024	1,280 x 1,024	1,280 x 1,024	1,280 x 1,024	1,280 x 1,024	1,280 x 1,024	1,280 x 1,024
	188/238	231/271	147/202	106/146	144/192	208/243	208/235	196/229
	2.3	1.8	2.4	1.8	2.1	2.2	2.3	2.1
	102.4	84.7	104.7	85.5	100.4	100	112.2	97.6
	$1,049	$899	$999	$961	$999	$1,099	$1,099	$899

Sub-$2,000 servers

Managing systems and files in an office requires dedication. *David Lin* looks at 10 sub-$2,000 servers that will keep your small business running smoothly.

Small business servers are great in departmental offices or branch offices for handling email, Web services, printing and general file serving for an office of no more than 20 seats. But a PC with extra storage, memory and a Network Operating System (NOS) doesn't make a server — real servers are designed and built from the ground up.

So who requires one of these boxes? The simple answer is anyone with a need to have two or more computers talking to one another.

How we tested

We asked vendors to provide a server under $2,000 with CPU, storage and memory, but without a Network Operating System.

We created a real standalone closed network in our labs and implemented 10 client PCs, a network control PC and a Gigabit switch in addition to the servers.

All clients were installed with Windows XP Professional. Five IBM ThinkPad R40 notebooks and five IBM NetVista desktop machines; the controlling PC was an IBM ThinkCentre S50. Netgear supplied the GS516T 16-port switch. Thanks go to both IBM and Netgear for their generous supply of this equipment.

The clients, controller and server were connected to the switch and each client was installed with Netbench 7.0.3, a server benchmarking program from eTesting Labs (*www.etestinglabs.com*). Each server, whether it came installed with NOS or not, had Windows Small Business Server 2003 Premium Edition installed with 11 users, DHCP and shares enabled.

The server was then subjected to Netbench's disk mix tests, which measure how well a server handles I/O requests from Windows clients. The disk mix introduces a lone client onto the server and then ramps up clients one at a time until all clients are accessing the server.

Two results were measured. Actual throughput measured in Megabits per second (Mbit/s) with higher numbers indicating better performance. Response times were measured signifying the time it took the server to respond to the client's request during the course of the throughput testing. Response times were measured in milliseconds (ms). In this case, a lower score was the better result.

But there's more to it than that. In terms of quality and value -for-money, any one of the servers in this Labs Challenge can adequately handle file serving duties for a small office. But the purchase of a server is only a part of the overall strategy that involves networking the office. Deciding whether or not to run with a file server also encompasses the number of seats currently needed and future expansion.

Other decisions to be made include whether the server's main storage is direct-attached (DAS) or network-attached (NAS), the type of storage (IDE, SCSI or SATA), and how much storage is needed for the present and the future.

Processing power isn't much of a concern at this end of the scale, but there are some sensational bargains when you realise that even dual processor systems come in under the $2,000 cap. Rather, the server's motherboard chipset and its features should figure more prominently in your deliberations.

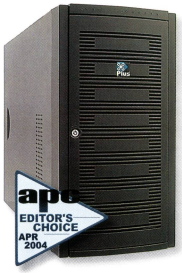
Do you want one or two network interfaces (NICs) on the server? Is Gigabit Ethernet capability a necessity? Typically, the servers running two NICs will have a Gigabit NIC servicing the office and a 10/100Mbit NIC linking to the outside world. Does your office have broadband or are you planning to have it installed? If the office is to be completely self-contained, a second NIC is possibly redundant.

Apart from the hardware, the most expensive part of integrating a server into your organisation could involve the operating system. All of the servers in this roundup are certified to run Windows Server 2003 but that may not necessarily be your NOS of choice. The cheapest version of Windows Small Business Server 2003 (Standard Edition) will set you back $1,099 with five client licences or $219.80 per initial seat, but Linux could save on costs.

Then there's the environmental considerations. Do you go for a tower or rack model? A tower can stand by itself in an office, but a rack model needs a server room or enclosure as both of the rack-mounted servers submitted are far too noisy to operate in a normal office space.

Finally we come to the question of brand name versus white box. The answer is the same for desktop PCs as it is for servers: it just depends on your needs. We tested offerings from major vendors Acer, HP and Dell, as well as local players. They're all solidly built and their specifications were as expected.

Factors including reliability, compatibility, manageability and service options are a big consideration when a server is likely to be required for round-the-clock availability. Many sites that deploy these small servers won't have a regular IT guru dedicated to the task of maintaining the infrastructure. As a result, the decision on how to keep the server up and running, and the support you get from the vendor, will be the major factors to consider when deciding which server makes it into your office.



Plus Titan OP240

When it comes to servers, we'd always thought that two processors were better than one. . . until we encountered the Titan OP240, that is.

The Plus Titan OP240 blows the others out of the water when serving files and is the only unit in this roundup to utilise an Opteron processor. Although the Opteron 240 only runs at 1.4GHz, its sophisticated memory and FSB frequency more than make up for a lack of clock speed. Provision for a second processor on the Tyan S2875 motherboard makes it capable of serving a busy medium-sized office.

The Titan is fitted in an oversized tower that can even be laid on its side and passed off as a 5U rack-mount. An optional rack-mount kit is available for $195.

Annoyingly, the front cover doesn't have a cut-out tab for opening it with your fingers. Internal access is gained through the thumbscrewed side panel, revealing a plain layout with the storage bays at the front and plenty of space above the motherboard. The motherboard's lack of onboard graphics makes the Titan the only server in this roundup to boast an AGP graphics adaptor.

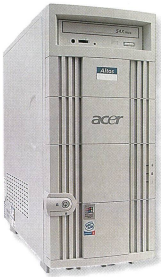
Two 36GB WD Raptor 10,000rpm SATA drives in a RAID 1 (mirrored) array forms the main storage, but there's room for up to five hard disks. These can be fitted with backplanes to convert the drive bays to IDE or SCSI hot-swap enclosures.

A fan mounted on the side of the drive cage facilitates airflow through the chassis — which is necessary as there's no air intake at the front of the system, and the Raptor drives run very hot. An 8cm fan is mounted at the back of the box, with provision for another on the lower part of the drive cage. The motherboard itself provides up to six fan headers — despite this, the Titan is the quietest server in the line-up. A three-year, on-site service is also part of the package.

The lack of a second Ethernet port and choice of chassis are questionable. But performance is excellent with a response time of 0.269ms and a peak throughput of over 61Mbit/s, beating the Armaserv SP100 by nearly 3Mbit/s.

Details

Contact	Plus Corporation
Phone	1800 007 587
Online	www.pluscorp.biz
Price	$1,995
✔	Blinding performance.
✖	Only one Ethernet port.
Verdict	●●●●◐



Acer Altos G300

Acer is quite a big player in this area, so we were very interested in how its entry-level Altos G300 would perform. It's a Pentium 4 class machine with a 2.8GHz processor mounted on a ServerWorks GC-SL chipset motherboard with 512MB of ECC PC2100 DDR memory.

The G300 has an average-sized mid-tower chassis, which can be positioned on its side and used as a desktop machine, or alternatively as a 6U rack-mount. The front panel unclips and thumbscrews release the side panel for internal access.

Storage is well catered for with a drive cage able to accommodate three hard disks and three 5.25in devices. On our test unit, one of the bays was occupied by the CD-ROM drive and two hard disks were fitted. The hard drive cage, which has a small fan in front of it to circulate air, can be removed and allows for hot-swapping if the drives are so configured.

On this occasion, the pair of 40GB Seagate BarracudaV SATA drives were configured in a RAID 1 array using the onboard LSI Logic MegaRAID IDE133 RAID controller. While SATA RAID is the more popular RAID implementation in the servers reviewed here, the motherboard on the G300 doesn't support it. Anyone contemplating a SATA array for their business would have to look at third-party expansion card solutions.

One of the benefits of SATA is its cabling, which is narrower than the ribbon cables used on IDE devices. Even though Acer's IDE cables are crimped to promote airflow, there's still a mess of cabling inside the box.

There are five vacant expansion slots, four 64-bit PCI, uncommon in servers at this level, and the fifth is 32-bit. This might balance the lack of a second Ethernet port, which is a desirable option on any server that needs to connect externally.

The G300 is a bit of a mixed bag for anyone looking for a purpose-built entry-level server. There's no second Ethernet port and it's just a moderate performer when subjected to a 10-client load.

On the plus side, it includes a strong management suite and three-year, on-site warranty that would suit smaller companies with little in the way of technical resources.

Details

Contact	Acer
Phone	1300 366 567
Online	www.acer.com.au
Price	$1,999
✔	Easy servicing and installation.
✖	Untidy IDE RAID cabling.
Verdict	●●●○○

Altech Apollo Server

Altech isn't well known for its servers, but it's Apollo is an interesting entry. It's the only vendor to demonstrate hot-swap drive capability. Hot-swap was a facility built into the original SATA spec but this is the first occasion we've seen it implemented.

The Apollo is based on the Tyan S5102 motherboard — which uses the Intel 875 chipset with a twist. Normally 875 family boards allow SATA RAID 0 and 1 natively, but Tyan's implementation supplements the ICH5R RAID controlling chip with a Promise Technology SATA RAID controller. The two 120GB Maxtor Diamond Max Plus 9 SATA drives plug into individual enclosures with a SATA backplane, sitting in two of the 5.25in drive bays.

When the drives are configured for a mirrored array, it's possible to simply unlock a drive while the system's running, remove it from the enclosure (provided all the drivers have been correctly loaded), and the system continues to work off the remaining drive. This feature is welcome in a server environment, especially when it comes to maintenance work and security. If anything goes wrong, the intact drive can (in theory) rebuild the array.

We tested the rebuild theory by pulling a drive, copying a few files to the remaining drive and deleting some others. When we plugged the second drive back in, the system began to rebuild and after a minute or so, drive activity ceased and both drives were once again identical.

Building the main storage as an array mounted in the 5.25in bays leaves another six conventional 3.5in drive bays unoccupied — not ideal but it can't be helped in this situation. Don't get the idea of filling these bays with drives and adding them to the array: the controller won't accept them unless they're IDE drives. There's ample airflow due to the excellent quality of the Antec case, with two rear-mounted case fans and airflow through the front of the chassis. System noise is comparable to a desktop PC.

The Apollo's throughput is around the middle of the pack, while its response time sits at the lower end of the scale. Appealing server-specific features include the dual NICs and the hot-swap SATA RAID options. But the one-year, RTB warranty and lack of system management features means there are better deals to be found.

Details	
Contact	Altech Computers
Phone	(02) 9735 5655
Online	www.altech.com.au
Price	$1,999
✔	Hot-swappable SATA RAID.
✖	Slow throughput.
Verdict	●●◐○○

Armaserv SP100

One of the surprise packages in this roundup is Westan's entry-level Armaserv SP100, which gives a strong performance across our benchmarks amid stiff competition.

Westan has put together a neat package consisting of a 2.8GHz Pentium 4 married to an Intel S875WP1-E motherboard (similar to the Viewmaster UNO VMP) and 1GB of ECC PC2100 DDR memory in a mid-tower configuration. The company opted to use a pair of WD Raptor 10,000rpm SATA drives in a mirrored (RAID 1) array, with a motherboard sporting only two SATA ports (the Viewmaster has six). RAID functionality is controlled by the ICH5R chip and only supports RAID 0 and 1 natively.

The drives are housed in a cage that can hold up to four drives. Draft through the case is maintained by an oversized 8cm fan at the back, and another pulling air through the front louvres directing it over the drives — a prudent move considering these 10,000rpm Raptor drives tend to heat up.

The front fan can be removed, the assembly making way for hot-swap drive bays if called for. We get the feeling it would be very difficult for this server to overheat, such is the force of the draft blowing out the back. The trade-off for superior airflow is that the Armaserv is one of the loudest servers we've ever had in our labs.

Unlike the larger towers, such as the Titan OP240 and Viewmaster UNO VMP, the Armaserv SP100 is the size of a normal desktop tower. As a result, the system fits together more snugly and has a neater internal cable arrangement than the others. Server-specific functionality includes dual NICs, one of which is a Gigabit port.

Netbench throughput peaked at 58.304Mbit/s with a 10-client load and a response time of 0.385ms, beaten only by the peerless Titan OP240. The Armaserv tends to improve its relative performance as the clients ramp up. The gap between the Armaserv and the slower competition is narrow when one or two clients are hammering the server.

But as more clients are added and the lesser servers lag in throughput, the Armaserv grows stronger — a healthy sign and a good endorsement for the Armaserv as an entry-level file server that can keep up with the needs of your growing workforce.

Details	
Contact	Westan
Phone	(03) 9541 8888
Online	www.westan.com.au
Price	$1,998
✔	Super cool running temperature.
✖	Very noisy.
Verdict	●●●●○

Dell PowerEdge 1600SC

Dell has long enjoyed success in the server space. The PowerEdge 1600SC is an entry-level server in a range that extends to the enterprise level. It can accommodate dual Xeon CPUs, although to fit under our price cap, only one 2.4GHz processor is mounted with 256MB of RAM.

The 1600SC is easy to pull apart. Access is gained by loosening three thumbscrews on the front flap to remove the side panel. The server is divided into three sections running the depth of the chassis. The top section is comprised of optical and floppy drives at the front and the power supply at the rear, reinforced by a strut. The middle section has a 3.5in drive cage at the front and the main body of the motherboard including the dual CPU sockets and memory. An oversized 8cm fan mounted on the back draws airflow through the front to the rear.

A plastic strut divides this section from the lower section, which has another 8cm fan mounted at the front drawing air across the expansion slots. It's neat and keeps a constant stream of air circulating across the areas that need it.

A single 36GB 10,000rpm Seagate Cheetah drive is fitted — an expensive commodity and the only SCSI drive in this line-up. SCSI was once mandatory for any serious server implementation, but as can be seen from the feature table (page 96), entry-level SCSI hardly makes an impression these days.

Up to six IDE drives (or four non-hot swappable SCSI drives) can be comfortably mounted. If you prefer hot-swap and a RAID configuration, Dell can cater for this need. The expansion slots are also a mix of PCI-X, 64-bit PCI and 32-bit PCI, the only server in this roundup to offer all options.

Even though the PowerEdge 1600SC couldn't best the throughput of the Titan OP240, it's consistent as tests ramp up from one to 10 clients. With its great build and impressive features and options, the 1600SC comes very close to the Editor's Choice.

Readers interested in purchasing a PowerEdge 1600SC need to cite the E-Value Code PS-115-PE1600SC/2400 to guarantee the quoted price and configuration.

Details	
Contact	Dell
Phone	1300 303 107
Online	www.dell.com.au
Price	$1,799
✔	SCSI drive and impressive expansion options.
✖	Low memory.
Verdict	●●●●○

HP TC2120

Since HP is the largest server vendor in the world, we expected big things from the entry-level TC2120.

And at first glance, it doesn't disappoint: its plain tower has tool-less entry and some other nice features that we've come to expect from the big brand-name manufacturers.

The basis of the TC2120 is the ServerWorks GC-SL chipset motherboard running a 2.66GHz Pentium 4 CPU and 512MB of PC2100 ECC DDR memory. It's not the fastest kid on the block and holds the wooden spoon for slowest throughput of all the servers. We were also disappointed that it only has a single NIC, however, it does support five 64-bit PCI slots.

Main storage is slim with only a single 40GB Maxtor DiamondMax Plus 8 ATA/133 drive fitted, but HP offers the option of a SCSI adaptor. HP can configure the TC2120's storage to a maximum of 240GB (3 x 80GB) using IDE or 109GB (3 x 36.4GB) under SCSI. No RAID options are offered, although HP has deemed the Promise FastTrak 100TX2 IDE RAID controller suitable for the TC2120.

The storage bays are a conventional mix of external and internal bays. The top bay is a floppy drive and the next three bays are 5.25in. Just one of these is occupied by the CD-ROM, allowing room for a tape drive or even a third hard drive. Below the 5.25in cage is the 3.5in cage, which faces east-west across the chassis for easy access, which can accommodate two drives.

Airflow is good with a single 8cm case fan mounted on the back panel and plenty of ventilation passing through the louvred front and side panels.

With Windows Small Business Server 2003 and 512MB of memory, the quoted price is $1,995. However, it can also be purchased without the NOS for $1,595. Given that the most basic version of SBS 2003 is $1,099 with five client licences, it's definitely cheaper to have HP supply the NOS as well.

At time of writing, HP was also about to launch its Proliant ML110 server. The ML110 will be marketed in the same space as the TC2120, but with the new Intel E7210 chipset (a modified Canterwood chipset especially for servers) which might boost this model's lacklustre throughput.

Details	
Contact	Hewlett-Packard
Phone	13 23 47
Online	www.hp.com.au
Price	$1,595
✔	Bargain price.
✖	Slow throughput.
Verdict	●●●◐○

Maxtron Server 124B-XN

The more impressive of the two rack-mount servers in this Labs Challenge is the Maxtron 124B-XN. It's a far heftier unit than the Supermicro Superserver 5013C, even though it's still a 1U height rack, due to its depth. But the reason for this becomes apparent once you prise the cover off.

This rack can accommodate a second Xeon CPU in the Supermicro X5DPA-TGM motherboard. It's a serious server with an Intel E7501 chipset board, dual Ethernet ports and 512MB of memory. The front panel has a number of LED indicators for up to four disks, two NICs and sensor alarms. But two hot-swappable drive bays dominate the front. Only one 120GB WD Caviar SE SATA drive is supplied, so RAID couldn't be implemented, but it's reassuring to know this server has the capacity to grow in storage and processing power.

Four fans serving both CPU sockets and the drive bays are located in the middle of the rack. There's also a fan behind the power supply and another one on the PSU itself, making it the noisiest in this roundup. Some racks can make do without an enclosure and sit in a general office environment, but this server needs its own room.

There are five 32-bit PCI slots, including one on a riser. Like all 1U racks, only the slot on the riser can be used unless you want to run it with the top cover off.

Performance-wise, the Maxtron is one of the slowest servers when it comes to throughput, peaking at 50.752Mbit/s. This is reflected in the response time, which is a poor 0.797ms. In this case, the choice of the 1.8GHz Xeon proves the fatal flaw. Not only is it restricted by a 400MHz FSB against the 533MHz FSB of the later Xeons, 800MHz FSB of the Pentium 4 or the 1.4GHz of the Opteron 240, but the CPU is no longer available. If this hot-swap drive, rack-mount server interests you, then you'll need to consider reconfiguring and re-pricing it for a more capable CPU.

Details

Contact	Digicor
Phone	1300 788 886
Online	www.digicor.com.au
Price	$1,995
✔	Hot-swappable drive bays.
✖	Noisy; slow.
Verdict	●●●○○

Supermicro Superserver 5013C-M

Smaller than the Maxtron 124B-XN, this rack-mount server starts life with only the barebones components: rack enclosure, power supply and motherboard. You add the Pentium 4 CPU, PC2700 DDR memory and storage. The Supermicro Superserver 5013C-M is a 1U rack, but it has all the building blocks to turn it into a modest server or NAS, starting with the Intel 875-based Supermicro P4SCE motherboard.

The Superserver 5013C-M's biggest restriction becomes apparent as soon as you open the case. There's only provision for a single hard drive, whereas the roomier Maxtron affords dual hot-swap bays. Where you'd expect to see another drive bay (next to the existing bay on the front right side), there's an internal cooling fan which blows across the CPU heatsink and memory slots. Since it's the only cooling mechanism apart from the power supply, it can't be dispensed with.

The floppy and optical drive could be pulled out to allow an extra hard disk, but pulling a floppy drive from a server is always a perilous move and one avoided by most network administrators.

This lack of space for an extra drive makes the SATA RAID options that come with the motherboard redundant, although you could try fitting two notebook SATA drives alongside each other to make an array. Lack of space will also confound you if you attempt to make use of the five PCI expansion slots. Four slots sit on the board and another on a riser, but like all 1U racks, the only usable slot is the one on the riser.

Good server-specific features are the dual NICs, including Gigabit, which make integrating into a connected office more flexible, and a bank of LED indicators for either NIC and drive access.

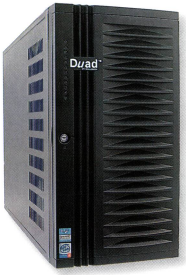
The Superserver 5013C-M throughput is hardly super, registering 51.049Mbit/s with a 10-client load, making it one of the slowest servers. Response time is the second slowest in the line-up.

This unit does have some attractive features but realistically, the limited expansion capabilities only make it only a stopgap measure.

Otherwise, this could be a suitable solution for a situation which isn't going to alter drastically over the course of the server's lifetime.

Details

Contact	Digicor
Phone	1300 788 886
Online	www.digicor.com.au
Price	$1,995
✔	Small, lightweight rack.
✖	Limited storage options.
Verdict	●●◐○○



Viewmaster UNO VMP

Hallmark's entry, the Viewmaster UNO VMP, is a big tower along the lines of the Plus Titan OP240. Like most of the contenders at this end of the server market, it uses an all-Intel solution — in this case, a single 3GHz Pentium 4 processor on an Intel S875WP1-E motherboard, with Intel's entry-level server board based on the desktop 875 chipset.

Two screws need to be undone before the side cover can be removed. There's plenty of room inside, about the same as the Titan, with storage bays dominating the front quarter of the system. Hallmark has fitted a pair of 120GB Seagate BarracudaV SATA drives and formed them into a mirrored array. Option kits are available to convert to hot-swap bays.

Up to six SATA devices can be connected to this motherboard, unheard of on desktop boards and rare on servers. A Promise Technology PDC20319 RAID controller that allows RAID configuration of 0, 1 or 0+1 supplements the ICH5R chip, which normally controls the SATA RAID.

The S875WP1-E is a compact board and appears almost lost in such a large chassis. Consequently, it suffers from the same malaise as other systems with oversized cases (or undersized motherboards) — a gap between the back of the storage drives and their motherboard connectors. Hallmark has done a good job keeping the clutter to a minimum. Internal circulation is more than adequate with a large 8cm fan on the back panel above the dual NICs (including a Gigabit port), and another pair of smaller fans sitting below the large one drawing air from the front, across the system, then out the back.

The UNO VMP is one of the slickest Pentium 4 servers in this test, consistently maintaining a high level of throughput as network clients are ramped up. It's a step behind the Armaserv SP100, which has very similar specs, managing 57.076Mbit/s with a 10-client load and 0.444ms response time. The UNO VMP should have been nominally faster with a quicker CPU and standard PC3200 desktop memory instead of the ECC PC2100 used in the Armaserv. Nevertheless, this is a fine entry-level system, especially for anyone needing RAID capabilities.

Details	
Contact	Hallmark
Phone	(02) 9748 8811
Online	www.hallmark.com.au
Price	$1,995
✔	Six SATA ports and several RAID options.
✖	Oversized case.
Verdict	●●●●○

Xenon Radon ML24A

Xenon is the only vendor which managed a dual-CPU server under the $2,000 price cap. Dual 2.4GHz Xeon processors are used on a motherboard based on Intel's E7501 chipset, making the Radon one of the most powerful servers in the line-up.

We were surprised when our diagnostic programs indicated that the dual Xeons were engineering samples of the latest Intel chip — in this case 1MB of on-die L3 cache differentiates the processors from the more standard fare.

Outwardly it's a nondescript machine. The tool-less entry through the side panel reveals a congested storage area at the front and plenty of space behind the drive cages. There's room for up to four hard disks with two used in a SATA RAID 1 array, consisting of a mirrored pair of 80GB Maxtor DiamondMax Plus 9 SATA drives. The cage is oriented east-west across the chassis and comes with mounting rails for easy access.

Its 1GB of PC2100 ECC registered memory means the Radon can easily handle any applications thrown at it. Access to the DIMM slots is slightly obscured by the 8cm case fan mounted on the rear panel. Otherwise, the entire expanse of the motherboard is open for inspection. Dual Ethernet ports allow the Radon easy integration into a network. The dual CPU coolers and the case fan draw air through the louvres at the front, ensuring a good flow-through draft. It's no louder than a desktop PC, even with the cover off.

There are still a few things that we'd like to have seen, such as a SCSI option, hot-swap drives and PCI-X support — components that would certainly be included in a power user's definition of their dream server. But we aren't complaining.

The Radon didn't manage to supplant our Editor's Choice in the performance stakes despite having dual processors.

Throughput with a 10-client load measures at an average of 56.964Mbit/s and is pipped for second place by the Armaserv, which is surprise. Nevertheless, in terms of the sheer amount of hardware you get and the three-year, onsite warranty, Xenon should be commended for putting together such a mammoth bundle for under $2,000.

Details	
Contact	Xenon Systems
Phone	1300 888 030
Online	www.xenon.com.au
Price	$1,980
✔	Dual Xeon power.
✖	Disappointing performance.
Verdict	●●●●○

Servers

Model	Acer Altos G300	Altech Apollo Server	Armaserv SP100	Dell PowerEdge 1600SC
Contact	Acer	Altech Computers	Westan	Dell
Phone	1300 366 567	(02) 9735 5655	(03) 9541 8888	1300 303 107
Online	www.acer.com.au	www.altech.com.au	www.westan.com.au	www.dell.com.au
Price of tested configuration	$1,999	$1,999	$1,998	$1,799
Dimensions (mm)	450 x 190 x 500	523 x 205 x 472	400 x 235 x 480	447 x 217 x 572
Rackable	Optional	No	Optional	No
CPU	2.8GHz Pentium 4	3GHz Pentium 4	2.8GHz Pentium 4	2.4GHz Xeon
Number of CPUs supported	1	1	1	2
L2/L3 cache	512KB/0	512KB/0	512KB/0	512KB/0
Motherboard chipset	ServerWorks GC-SL	Intel S875P	Intel S875P	ServerWorks GC-SL
Installed memory	512MB PC2100 ECC registered	1GB PC3200	1GB PC2100 ECC unbuffered	256MB PC2100 ECC registered
Maximum memory	4GB	4GB	4GB	4GB
Total RAM slots	4	4	4	4
Integrated network interface adaptor	Intel 82540 10/100/1000	Intel 82540 10/100/1000	Intel 82540 10/100/1000 + Intel 52551 10/100	Intel 82541 10/100/1000
Built-in NIC ports	1	1	2	1
Total/free/hot-pluggable slots	5/5/0	4/4/0	3/3/0	6/6/0
PCI-X	0	0	0	2
64-bit PCI	4	0	0	2
32-bit PCI	1	4	3	2
SCSI adaptor	Optional	No	No	Yes
Total/free internal 3.5in drive bays	3/1	6/6	1/0	6 (SCSI hot-plug) or 4 x non hot-pluggable)/5
Hot-swappable	No	Yes	Optional	Optional
Hard drives installed	2	2	2	1
Interface type	ATA/100	SATA	SATA	Ultra320
RAID controller	LSI Logic MegaRAID IDE133	Promise FastTrak 378	Adaptec/Intel ICH5R	Optional
RAID levels supported	0, 1	0, 1, 0+1	0, 1	
Bootable CD-ROM drive	Yes	Yes	Yes	Yes
Power supplies	1	1	1	1
Wattage	300	400	450	Not stated
Hot-swappable/redundant	No	No	No	Optional
Fans	2	2	2	2
Sensors for fan speeds /temperature/voltage	Yes	Yes	Yes	Yes
Fault tracking/remote reboot	Optional	Optional	Yes	Yes
Remote alert via SNMP/pager/modem	Yes	Optional	Yes	Yes
Standard warranty on parts and labour	3 years on-site	1 year RTB	3 years parts/1 year labour	3 years on-site
On-site service included in warranty	Yes	No	Optional	Yes
Standard on-site service response time	Next working day	Not stated	4 hours	Next working day
Throughput under 10 clients	54.280	51.385	58.304	53.578
Latency	0.588	0.750	0.385	0.623
Rating	●●●○○	●●○○○	●●●●○	●●●●○

HP TC2120	Maxtron Server 1248-XN	Plus Corp Titan OP240	Supermicro Superserver 5013C-M	Viewmaster UNO VMP	Radon ML24A
Hewlett-Packard	Digicor	Plus Corporation	Digicor	Hallmark	Xenon Systems
13 23 47	1300 788 886	1800 007 587	1300 788 886	(02) 9748 8811	1300 668 030
www.hp.com.au	www.digicor.com.au	www.pluscorp.biz	www.digicor.com.au	www.hallmark.com.au	www.xenon.com.au
$1,595	$1,995	$1,995	$1,995	$1,995	$1,980
473 x 205 x 467	430 x 44 x 569	430 x 23 x 590	425 x 44 x 356	600 x 220 x 427	430 x 200 x 530
No	1U	No	1U	No	No
2.66GHz Pentium 4	1.8GHz Xeon	(1.4GHz) Opteron 240	2.6GHz Pentium 4	3GHz Pentium 4	2.4GHz Xeon-A (x2)
1	2	2	1	1	2
512KB/0	512KB/0	1MB/0	512KB/0	512KB/0	512kb/1MB
ServerWorks GC-SL	Intel E7501	AMD 8151/8111	Intel 875P	Intel 875	Intel E7501
512MB PC2100 ECC registered	512MB PC2700 ECC registered	1GB PC2700 ECC registered	1GB PC2700	1GB PC3200	1GB PC2100 ECC registered
4GB	8GB	8GB	4GB	4GB	8GB
4	4	4	4	4	4
NC7760 10/100/1000	Intel 82540 10/100/1000 + Intel 52551 10/100	Intel 82541 10/100/1000	Intel 82541 10/100/1000	Intel 82541 10/100/1000	Intel 82541 10/100/1000 + 82550 10/100 Ethernet
1	2	1	2	2	2
5/5/0	5/5/0	5/5/0		3/3/0	5/5/0
0	Optional	0	0	0	0
5	Optional	0	0	0	0
0	5	5	5	3	5
No	Optional	No	No	No	No
3/2	2/1	5/3	1/0	4/2	4/2
No	Optional	Optional	No	Optional	No
1	1	2	1	2	2
ATA/100	SATA	SATA	SATA	SATA	SATA
Optional	Intel ICH5R	Silicon Image SiI3114 SATA RAID Controller	Intel ICH5R	Promise PDC 20318/Intel ICH5R	Adaptec/Intel ICH5R
N/A	0, 1	0, 1, 0+1	0, 1	0, 1	0, 1
Yes	Yes	Yes	Yes	Yes	Yes
1	1	1	1	1	1
250	350	380	250	450	460
No	Optional	No	No	No	No
1	5	2	1	3	1
Yes	Yes	Yes	Yes	Yes	Yes
Nil	Yes	No	Yes	Yes	Optional
Optional	Yes	No	Yes	Yes	Optional
3-year parts/1-year labour	1-year RTB	3-year on-site	3-year RTB	3-year RTB	3-year RTB
1-year	Optional	Yes	Optional	Optional	Optional
Next working day	Various options	Not stated	Various options	Various options	Various options
46.348	50.752	61.063	51.049	57.076	56.964
0.750	0.797	0.269	0.773	0.444	0.449
●●●◐○	●●●○○	●●●●◐	●●◐○○	●●●●○	●●●●○

Do you trust this penguin?

Does Linux have what it takes to break away from its geek roots and win mainstream appeal? *William Maher* takes a swim with the penguin.

For a small piece of software created by a hermit-like hacker in an Finnish bedroom, Linux's rise to fame as the World's Most Dangerous OS is nothing short of amazing.

It's hard to think of a piece of software (or any other PC technology) that has had more ammunition thrown at it. It's been called a virus, been the subject of a US$1 billion lawsuit, and described as a security risk and potential tool for terrorism. And its reputation and perceived threat to the Gates empire only seems to be growing with time. "I'm not out to destroy Microsoft," creator Linus Torvalds famously told a reporter last year. "That will just be a completely unintentional side effect."

Is the Linux camp suffering delusions of grandeur, or does it actually have a chance to make history? On the one hand are those who point out Linux is a mere flyspeck in the shadow of Microsoft, accounting for less than a tiny 3% of desktop operating systems. Beyond the server market, the software is still largely a curiosity item loved by hackers, ignored by the rest. Even Torvalds himself admits the software isn't ready for "normal" people.

But on the other side, a legion of passionate supporters now have their sights firmly set on winning mainstream appeal. They say we've become slaves to a flawed operating system. Viruses, product activation hassles, software crashes, expensive upgrades — all problems that might be alleviated by getting rid of Windows, they argue.

Is it true? Have we all been living in the dark when it comes to our OS of choice? Are the Windows users of the world stuck in first gear, while Linux people enter what they say is a tweakable, customisable, virtually virus-free software nirvana?

Can these software rebels wipe clean 20 years of domination by Microsoft and convert millions of people to a kind of parallel computing dimension, where software downloads are free and your support crew includes thousands of geeks answering questions for no money?

It's a question that's dividing the PC world into two camps — the Linux believers, and those who find it hard to believe a free OS built with the help of volunteers can be good enough to compete with anything from Microsoft.

SPREADING THE WORD

In the minds of Linux activists, there's no doubt the OS has become an unstoppable force, capable of sweeping forth and forever altering the way we use computers. Just as Microsoft and Apple first used mass media in the early 1980s to spruik their vision, Linux backers are now doing the same. IBM used Muhammad Ali as the voice of the Linux revolution in a Super Bowl commercial watched this year by millions, most of whom probably scratched their heads in confusion.

"Linux/open source is a competitor like the rising tide," says Linux advocate and Cybersource CEO Con Zymaris. "It's slowly working its way into no-man's-land and flooding the trenches. Companies like SCO and Microsoft fire everything they have into the rising tide, but the tide doesn't ebb.

"[Rivals] will need to forget about their old mechanisms for competing, and will either need to learn to swim in this new realm, or drown."

At the user level, the issue has created two separate camps. "It's a culture. It's wanting to be part of something big," says Andrew Lau, who works on the Debian GNU Linux project and weaned himself off Windows years ago. "As far as I know, Linux is the only open source operating system to have user groups that meet up once a month, and have dinner, drink beer together."

The way Lau sees it, computers have become dumbed down, and the complexity, the real power, is being increasingly taken away from the user's grasp. "Windows doesn't give you the choice to find something that suits you. It's there and it's not very malleable. It's like a glove that doesn't fit properly.

"Linux is like an open playground — you can explore every nook and cranny. Windows users are led around."

Take Microsoft Office. "How do I describe Office? They try and put everything into the core. The philosophy of Unix is to have small programs that do one thing really well, instead of many things badly.

"Mainstream society doesn't know there's another way. Even if it's an inefficient way, [Windows users] will keep doing it because that's the way they've been taught."

After speaking to Andrew it's hard not to feel dirty for filling your hard drive with Microsoft products. You haven't been just installing applications; you've been contaminating your PC with bloated, poorly coded, insecure lumps of ethically unsound software.

There's also a vague, underlying political element to the fervour of Linux supporters. Lau says many have "Orwellian-type fears" about Microsoft controlling all computers and information. Probably the best example of this distrust comes from open source figurehead Eric S. Raymond, who wrote the unofficial Linux versus Microsoft Bible: *The Cathedral and the Bazaar.*

As Raymond explains on his Web site: "Bill Gates is someone that has pissed me off from day one. I don't mind that he got rich, but I do mind that he peddles himself as the ultimate hacker and God's own gift to technology when his track record suggests that he wouldn't know a decent design idea or a well-written hunk of code if it bit him in the face. He's made his billions selling elaborately sugar-coated crap that runs like a pig on Quaaludes, crashes at the drop of an

Linux is like an open playground

electron, and has set the computing world back by at least a decade."

What Raymond and his disciples crave, and what they're not yet getting, is for everyone else to "see the light".

"We don't want Linux to be this closed off group, we don't want it to remain on the sidelines forever. We don't want just techies to use it, we want everyone to use it, because ethically it's a lot better than Microsoft," says Lau.

He says Linux users have been sidelined, struck out of the picture. "Whenever you watch the news and a big virus or worm outbreak happens, they give the impression that it affects every system in the world. They don't say it only affects Windows computers. They don't say anything about Apple, Linux or Unix.

"People don't seem to understand the dangers of a homogenous network. Where everything is uniform, and everything has the same vulnerabilities."

But for every passionate Linux supporter, there are critics who say the software is a headache to use. Posted one disgruntled Linux user on Slashdot: "it doesn't do the job for the vast majority of people who actually want to use a computer without needing to recompile half of the OS."

"The problem is that hackers are very, very different people from your average Joe on the street," explains Jeff Waugh, a Linux developer and former president of Linux Australia. "They are more likely to put up with computer frustrations. They're more likely to understand the mechanics of a computer."

The rise of Linux

1983
Richard Stallman creates the General Public License (GPL).

August 1991
Linus Torvalds announces Linux.

June 1993
First commercial Linux released, called Slackware.

June 1994
Digital Equipment Corp (DEC) funds 64-bit Linux project.

November 1998
"Linux has a chance at the desktop market" from leaked internal Microsoft memo.

January 1999
Hewlett-Packard and Compaq announce plans to offer Linux-based systems.

March 1999
The first LinuxWorld Conference and Expo attracts 12,000.

September 1999
"Linux at this moment can be considered more a plaything for IT students," says SCO.

March 2000
Survey shows Linux software on 60% of Web servers.

July 2000
StarOffice to be released under GPL.

June 2001
Microsoft president Steve Ballmer describes Linux as a "cancer". (Chicago Sun-Times)

June 2001
Bill Gates describes the GPL as "Pac-Man-like". (News.com)

March 2003
SCO files US$1 billion lawsuit alleging copyright infringement in Linux.

May 2003
The German government votes to switch 14,000 PCs to open source. Other governments begin defecting to Linux.

June 2003
*The Sourceforge site (**http://sourceforge.net**) claims to host more than 60,000 open source projects.*

Jan 2004
SCO's letter to US Congress describes Linux as a "threat to our national security".

LINUX FOR DUMMIES?

If Linux is to move beyond its niche, independent software and hardware vendors will have to jump on board with support. Until then, everyday tasks may be too difficult for ordinary people. Even the CEO of Red Hat Linux shocked the faithful by calling Linux "sub-par" when it comes to everyday jobs like plugging in a scanner.

Putting a friendly face on Linux is something being undertaken by groups building graphical environments such as KDE and GNOME. Waugh says there is now a big "mental shift" in the Linux community to reshape the software for "real" people. Projects like freedesktop.org (**http://freedesktop.org**) are trying to unite the various different desktop environments and ensure compatibility.

Meanwhile, the world-conquering armies of Linux users are only just starting to get some backing from mainstream brands such as Acer, which is offering a Linux option on its business systems. Linux vendor SuSE is also selling Linux PCs online in the US and HP also sells Linux notebooks and desktops, but they're not all your usual boxes. Armed with Transmeta chips, rather than Intel CPUs, the cut-down HP machines are designed as terminals rather than full-blown PCs. Not exactly something that quickens the pulse.

"The server market is very simple, the desktop market is a whole other proposition," explains METAGroup analyst Kevin McIsaac. He points out that while Linux is great for servers because it offers a way to get networking done using cheap Intel boxes, on the desktop everyone's already using those same cheap Intel machines.

At best, McIsaac predicts only 7-10% of the world's business desktop PCs would be interested in Linux, adding, "I don't think they're going to smash Microsoft, like some do."

The reaction of most mainstream PC vendors is positively cold when it comes to ditching Windows on home PCs. A spokesperson for Dell said the company did offer Linux to consumers once, but a lack of sales ended that experiment. Acer says it now receives less than 50 requests a year for Linux from consumers in Australia.

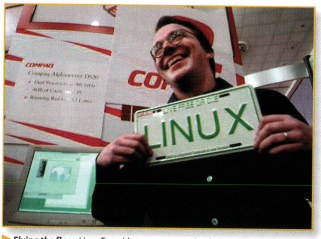
While the Linux vision espoused by Lindows and the like is of a world of cut-price, barebones PCs, it doesn't factor into the equation when it comes to the visions of HP and others, which are planning their future around "media centre" PCs, which play DVDs and TV.

"The customer is more interested in plug and play than saving a few dollars," claims HP's local marketing development manager, consumer desktops, Robert Bergqvist. "To steer clear of that would not be in the customer's interests."

Acer's Raymond Vardanega is a little more forthcoming, predicting that more consumer Linux machines will appear in time. In the US, Linux vendor Lindows is taking Microsoft head on with cut-price PCs sold in Wal-Mart, as well as its online software store called the Click-N-Run Warehouse for consumer applications. "We need to go to the mass market that maybe has never even heard of Linux before," says Lindows CEO Michael Robertson.

But Vardanega can't see the OS shaking its hacker roots. "It's carved a niche. But going from a niche to anything more than that is a big challenge. Is there the acceptance? Is there the capability?

"For Linux to gain 20-30% of the desktop space is a quantum leap from where it is now. I don't expect to see a quantum shift."



Flying the flag: *Linus Torvalds manages to maintain a strong community focus — one of Linux's greatest assets.*

SPLIT PERSONALITY

For the moment, it seems Linux can't decide what it is. Server OS, geek plaything, business tool, consumer brand — for each and every option there's a team out there pursuing the dream.

High profile converts include Telstra, which is investigating the viability of a wholesale switch of desktop PCs from Windows to Linux. The Australian Democrats hope to emulate large-scale Linux adoption in other countries such as Korea, which aims to change over 20% of government desktops by 2007. Elsewhere, companies like Hewlett-Packard, which earned a whopping US$2.5 billion in Linux revenue in 2003, are discovering how to make money from Linux.

On the desktop, Linux is tipped to overtake Apple as Microsoft's number one rival this year, spearheaded by "friendly" versions such as Lindows and UserLinux. "It's a subculture that has raised its head into the mainstream," says Acer's Raymond Vardanega. Even the original Linux geek, Linus Torvalds, now drives a Mercedes and works for a "global consortium" devoted to Linux with the distinctly "unhackerish" name of Open Source Development Labs.

Whether Linux proves to be the software 80% of the world needs, as one advocate puts it, or something used by 10% of people remains to be seen. One Linux vendor, Mandrake, has already survived a bankruptcy scare. UnitedLinux, an attempt to build a single, worldwide Linux standard (there are hundreds of different types) is reported to be all but dead. IBM and other major Linux developers and customers have been battling a complicated US$1 billion lawsuit which alleges the software contains illegally copied code.

Yet for all the predictions of Linux's demise, like an annoying fly that won't go away, it just won't seem to leave Microsoft alone. "Linux and open source is the best thing that's ever happened to the software industry in its entire history," says Gartner analyst Robin Simpson. "The reason is that it has made everybody lift their game. It's made Microsoft really lift its game in terms of the way it develops software, the way it builds security."

It's no wonder a Microsoft executive wore a flak jacket as a joke on a visit to the recent LinuxWorld conference. Linus may not have conquered Microsoft, but he certainly has its attention.

Five-minute guide to Linux distros

Linux has launched itself into public consciousness in recent years, resulting in an explosion of different types available. *Matthew Overington* reports.

One of the biggest attractions of Linux for a developer is the fact that the source code is freely available and the components are modular. While this sounds obvious, it offers programmers a level of freedom to bolt their own modules and packages together to create a completely unique distribution to suit a specific purpose. Numerous teams of developers have put their own spin on the OS, and now there are literally hundreds of distros to choose from.

The teams generally use the same core modules and the Linux kernel, but the combination of extra packages, additional custom-built applications and installers differentiate between the versions on offer.

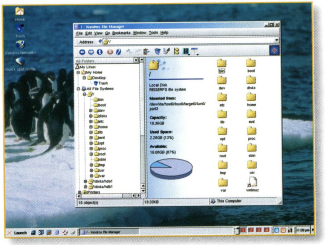
This range of choice is both a blessing and a curse: while there are hundreds of freely downloadable distros, there aren't enough developers working on many of the smaller sub-distros to speed their development. There's a strong argument that if there were fewer distros, the ones that did exist would receive more attention, but this goes against the community spirit on which Linux is based. The open source license encourages developers to work on whichever project takes their fancy, and this freedom of choice and source code is the reason Linux exists in the first place. While this freedom may be fantastic for developers, it doesn't make choosing the right distro for a given purpose any easier.

GENERAL DESKTOP AND SERVER

The biggest development movement has come from the mainstream desktop and server markets as Linux has matured and companies have realised they can make money from it. Many distributions have recently developed into server and desktop products, and it's no secret that Linux boxes make good, solid servers for business and enterprise environments.

Many large companies selling Linux-based products to enterprise clients (and more importantly, the support services that go along with it) are now offering a number of distinctly different solutions for different customers. Red Hat, for example, is offering Red Hat Enterprise Linux Advanced Server edition, Red Hat Enterprise and Red Hat Professional Workstation at a cost for enterprise customers, while still allowing home users to download Fedora free of charge. The buyers of the high-end products are entitled to support directly from Red Hat, but the Fedora users must rely on the good graces of other users in newsgroups and support forums. It's a model that seems to be working: Red Hat is starting to look profitable for the first time since its inception in 1996. SuSE and Mandrake also work to similar schemes.

While the more business-oriented distributions are plugging away at separate packages for server and workstation use, a few teams, such as Debian, have tried to make one-size-fits all distributions. Debian is the distro of choice at *APC*, as it provides the most flexibility of installation, an extensive package list and an outstanding software update engine.



▶ ***Easy does it:*** *Xandros brings powerful distros to the masses.*

It may be a little less user-friendly than many of the other major workstation distributions from Mandrake, SuSE, Sun or Red Hat, but it's completely free, powerful and customisable to boot. Of all the Linux distributions on offer, Debian has stayed true to the community ideals and philosophy espoused by the free software and open source movements. Help is always on hand via a range of support sites and newsgroups, and Debian users tend to be extremely dedicated to helping people get the most out of the OS.

Choice is a blessing and a curse

Debian has always had its apt service for rolling out updates, which is a massive benefit for users (and a major drawcard for the distro).

Debian is so widely regarded by the wider Linux community that it's been used as the foundation for many subsequent flavours, including the commercially available Xandros (our favourite distro catered specifically to beginners), and Knoppix (a bootable Linux flavour available on a single CD).

It's available in three different branches: stable, unstable and testing. The stable version, as the name implies, is tried-and-tested and contains only packages which are 100% reliable. If you're going to set up a desktop or server machine where reliability and stability must come above all else, then stable is the build to go for. Unfortunately, because of the time required to test every package, stable also tends to be out-of-date and not the most exciting build on offer. The testing tree contains packages that are undergoing testing for inclusion in the stable tree, and the unstable one is for all the cutting-edge developments that will eventually be cleaned up and rolled into the stable build. Truth is, most Debian users run a combination of packages from the stable and testing branches, and many are willing to even dabble with the unstable packages.

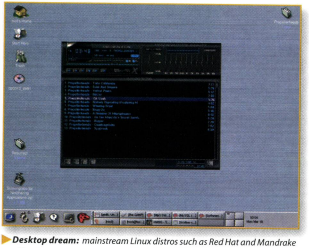
Although Debian provides massive flexibility and power, it's by no means the only power user distro. Slackware undeniably holds the mantle for the Linux distribution limited to geeks. Slackware is one of the oldest mainstream distributions in existence, having been born in the early '90s and religiously maintained since. It doesn't feature a polished graphical installer, or a massive range of cutting-edge features, but it's extremely Unix-compliant. Getting it up and running is a big enough challenge for most users, let alone working extensively with it. This obscurity is attractive to a few geeks who feel part of an exclusive club, but Slackware is never going to be a mainstream, widespread distribution.

SPECIAL PURPOSE

There are also a number designed to serve as firewalls on gateway machines. Smoothwall is by far the preferred firewall-specific distro and its developers have focused on creating a slick, simple, secure OS to provide network protection. The team has recognised that many older PCs are retired to serve as firewalls, so it includes a minimal set of packages and no graphical interface. It's primarily aimed for home and small business use, but it scales well and can handle the demands of small enterprise customers if attention is paid to deployment and maintenance.

As mentioned, a sure sign that Linux is being taken seriously is the growing number of companies willing to base their business model around the free OS. Lycoris, Lindows, Xandros are all building — and charging for — a new breed of distros aimed at the complete beginner. These builds are characterised by easy-to-use GUI installation programs and a limited application set. Where many Linux distros include several different versions of tools to accomplish a particular task (again, in the name of choice for the user), these only include one tool for a specific purpose.

Lindows, run by former MP3.com founder Michael Robertson, initially made headlines around the world by claiming that it was building a distribution that would run Windows code natively. Unfortunately, this hasn't come to fruition and the team has since abandoned the project in favour of making a simple, slick distro for low-end computer users. The company has made a concerted effort to get the OS bundled with super-cheap PCs in supermarkets in the US and UK, but is generally written off as being too much like Windows by experienced Linux users.



Desktop dream: *mainstream Linux distros such as Red Hat and Mandrake offer slick, developed installers and rich application suites.*

Much the same can be said for Lycoris Desktop/LX, which has gone down a similar path by selling the OS with inexpensive hardware in supermarkets and department stores. It also caters heavily towards the Windows user and is sneered at by hardcore Linux devotees. A subscription-based download service is available to help users install new applications, but most of the software on offer can be found for free elsewhere.

Xandros is by far our favourite distribution for beginners because it doesn't try to pander to the Windows user, but rather serves as a true introduction to Linux. It's built on a Debian base, is easy to install and use, and actually looks and feels like a more high-end Linux distribution. It, like others in its class, doesn't contain a massive package list, but stable, popular, best-of-breed applications. A number of *APC* staff members have used it as an introduction to the OS, and several are considering making the switch at home — the ultimate endorsement.

Phat Linux — which runs as a standalone executable under Windows — is another interesting spin on a Linux distro for inexperienced users. This is similar to BeOS personal edition, and a sensible way to enable existing Windows users to dabble in Linux, or for an administrator to run a Linux application in an enterprise Windows network. Unfortunately, it's not available for free download.

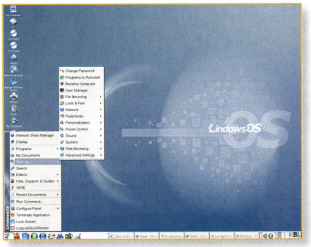
SUPER-SMALL FOR SPECIFIC NEEDS

Small builds are a popular segment of the distro market because they're easy to download and start working with. Also, because these smaller flavours aren't demanding of system resources, they're frequently the favoured OS to breathe new life into older hardware. These minimalist distros often contain highly optimised configurations for use in a wide range of environments, including: troubleshooting broken PCs; creating stereo components and set-top boxes; and just about any other application imaginable.

One of the most popular is the LNX-BBC (bootable business card) project, which can be found online at **www.lnx-bbc.org**. As the name implies, this sub-80MB flavour can be burnt onto a business card-sized CD-ROM and kept in a wallet or briefcase for troubleshooting or working while on the road. It's a complete, bootable OS that contains a basic set of tools to help get up and running away from either a regular PC or perform basic system recovery tasks. It's widely regarded as a sort of software Swiss Army knife, and many Linux administrators carry one around in their wallet: the geek version of "being prepared". Damn Small Linux also has a massive following and is just as useful to the trouble-shooter.

Another popular distro is CMMS (**http://cmms.sf.net**), which is designed for use in a car music player. It includes the basic packages that would be expected to play audio files, output to a soundcard, and accept input from a variety of sources. We built an in-car MP3 player (see *APC* July 2002, page 150), but the project has since grown considerably. A slight spin on the car-based distro is DeMuDi, a Debian-based build aimed at driving a computer as a home stereo component.

Still another tweak on the concept is Dave/Dina, which is built to run as a home entertainment system and deliver its output to



Straight out of Redmond: *the cheekily-named Lindows has taken the beginner's distro to extremes.*

a TV and stereo. It includes support for DVDs and a range of audio formats. It's tricky to configure, but works a treat.

MOBILE

The big move in relatively recent times has been to create portable, bootable Linux CDs, dubbed live distributions. The idea of running an entire operating system off a single CD is not new in itself (Apple even supplied a bootable CD with OS 9), and several Linux distributions have tried it in the past too (SuSE's Live-Eval is an excellent example).

A live CD is bootable and contains the Linux kernel, core modules, and a variety of popular packages preinstalled. All you need to do is boot off the CD, and you end up with a fully functional Linux desktop, replete with a GUI, productivity tools, networking support and Internet applications.

Live CDs are gaining popularity for a few reasons: it's the ideal way for a new user to sample Linux; it's fantastic for experienced Linux users to boot any x86 PC with a familiar operating system; and because the CD file system is read-only, there's no threat from viruses or malicious code. A live distro is the ultimate troubleshooting or productivity tool for the Linux-savvy geek, and means new users can try the OS without having to sacrifice hard disk space and wade through the setup process.

The LNX-BBC project is an example of a basic live distribution, although it's specifically designed for emergency use. If LNX-BBC is the Linux version of a Swiss Army knife, you can consider other live distributions to be fully decked-out toolkits. Most other live distributions provide complete, workable operating systems.

Earlier this year, MandrakeSoft made MandrakeMove (a live distro based on version 9.2 of its popular desktop Linux build) available to the public. Mandrake recommends the single CD distribution be used in conjunction with a memory key as a portable OS for use on the road. It boots without prompting into a functional, stable operating system and is rapidly becoming a favourite amongst beginners and old hands alike.

That said, the live distro of choice is still undeniably Knoppix. German-born Klaus Knopper started the project to build a basic OS so he could work away from his PC, and it has grown to become one of the most highly regarded live distros around. It's built on a Debian base and contains a massive list of applications. It features an extremely effective hardware auto-detection engine, which means that you almost always end up with a fully functional OS, GUI environment and suite of applications on most modern machines just by answering a few basic questions during boot.

CHOICE IS KING

We've seen the Linux market fragment in recent years, as developers put their own spin on the basic kernel and core modules. Companies such as Red Hat have tried to develop effective business models around Linux support, integration and services. Others have focused on producing stripped-down versions for use in embedded devices, while others yet have remained true to the original open source and free software ideals on which the operating system is based.

As mentioned, there's a phenomenal range of Linux distros out there to suit just about every conceivable purpose. It's even possible to roll your own if you're feeling adventurous. This, of course, means downloading the source for each and every package you'd like to include and compiling it manually — an ambitious project by anyone's standards. There's little reason to do so other than attaining a sense of self-satisfaction at bolting all the parts together to build an OS. Besides, there are countless intelligent, experienced and enterprising geeks that have done the dirty work for you. If you have a demanding set of criteria for choosing an OS, shop around and spend some time researching the available distributions before taking the plunge.

Head over to **www.distrowatch.com** for detailed, up-to-date information on just about every Linux distribution under the sun.

While Microsoft isn't yet running scared from the prospect of losing major contracts to Linux, interesting times are ahead as companies such as Red Hat finally start to look profitable and Linux filters down from the open source zealots and early adopters and into mainstream consciousness.

Blue skies: *Lycoris Desktop/LX borrows heavily from the Windows user interface.*

Linux migration guide

		Windows Product		Linux Equivalent	
		Publisher	Application	Application	Website
Audio & Video	Burners	Ahead	Nero	Nero Enterprise Edition	www.nero.com
	Players	Microsoft	Windows Media Player	Mplayer	www.MPlayerHQ.hu
			WinAmp	XMMS	www.xmms.com
	DVD players	Cyberlink	PowerDVD	Xine	http://xinehq.de
			WinDVD		
	Graphics	Corel	CorelDraw	InkScape	http://sourceforge.net /projects/inkscape
		Adobe	Illustrator		
	Image editing	Adobe	Photoshop	The Gimp	www.gimp.org
	Flash editors	Macromedia	Flash	F4L	http://f4l.sourceforge.net
	Digital photo viewers	ACD Systems	ACDSee	The Gimp	www.gimp.org
	Video editing	Adobe	Premiere	Linux Video Editor (LVE)	http://sourceforge.net /projects/lvempe
		Sony	Vegas		
		Pinnacle	Edition		
		Pinnacle	Studio	Kino	http://sourceforge.net/projects/kino
	Music	Steinberg	Cubase VST	Audacity	http://sourceforge.net /projects/audacity
		Sony	Sound Forge	Sweep	http://sourceforge.net/projects/sweep
Internet	FTP	GlobalSCAPE	CuteFTP	Igloo FTP	www.iglooftp.com/unix
	Pop-up blocker	Google	Google Toolbar	Mozilla Firebird	www.mozilla.org
	Chat	Microsoft	Messenger	Alvaro's Messenger	http://amsn.sourceforge.net
		ICQ	ICQ	Jabber	http://www.jabber.org
	Browsers	Microsoft	Internet Explorer	Mozilla Firebird	www.mozilla.org
		Opera	Opera	Opera	www.opera.com
	P2P	Sharman	Kazaa	N/A	N/A
		eMule	eMule	xMule	http://sourceforge.net/projects/xmule
		Limewire	Limewire	Limewire (Linux)	www.limewire.com
Web Developer	HTML editors	Coffee Cup	CoffeeCup HTML Editor	FCKEditor	http://sourceforge.net /projects/fckeditor
		Coffee Cup	CoffeeCup HTML Editor	CoffeeCup HTML Editor for Linux	www.coffeecup.com
		Microsoft	Front Page	BlueFish	http://bluefish.openoffice.nl
	Site management	Macromedia	Cold Fusion	Cold Fusion	www.macromedia.com
		Microsoft	Visual Studio	N/A	N/A
		New Atlanta	Blue Dragon	Blue Dragon	www.newatlanta.com
Business	Email	Microsoft	Outlook/Exchange	Ximian Evolution	www.ximian.com
		Qualcomm	Eudora		
	Spam filters	High Mountain	SpamEater Pro	Bogofilter	http://sourceforge.net /projects/bogofilter
	Finance	Quicken	Cashbooks	Fitrix	www.fitrix.com
	Productivity applications	Microsoft	Office	Open Office	www.openoffice.org
		Sun	Star Office	Sun StarOffice	www.staroffice.com
		Open Office	Open Office	Open Office	www.openoffice.org
Utilities & Drivers	File compression	Nico Mak Computing	WinZip	Info-Zip Unzip	www.info-zip.org/pub/infozip /UnZip.html#Linux
		Rar Lab	WinRAR	RAR 3.0 for Linux (command line only)	www.rarlab.com
	Database	Microsoft	SQL Server	MySQL	www.mysql.com
		MySQL	MySQL		
		Lotus	Domino	Lotus Domino for Linux	www.lotus.com
		Claris	FileMaker Server	FileMaker Server for Linux	www.filemaker.com
		Claris	FileMaker Client	N/A	N/A

Help at hand

The Linux community looks after its own when it comes to providing tech support. *Dan Lowden* points you in the direction of the best care online.

So you've finally made your choice on which Linux distribution to install. You've carefully considered all the available options and weighed them up against your needs in an operating system. But what if you've completed the install only to discover that your soundcard is mute and the USB wireless mouse just doesn't want to work?

As a general rule, where you go to seek help depends very much on the flavour of Linux you've chosen. But the thought of trawling through thousands of posts in a forum can be intimidating. Thankfully, there's a myriad of Web sites, forums and IRCs to help end your Linux woes.

FIRST PORT OF CALL: THE WEB

Generally, users will find the best help documentation on the product's Web site.

For newcomers to Linux, distributions such as Lindows, Lycoris and Xandros have been tailored for users who want to get up and running as soon as possible, without getting their hands too dirty with actual commands.

The Lindows quickstart guide (**http://info.lindows.com/quickstartNEW**) is an online resource for Lindows users to enable quick setup of system gadgets like printers and broadband modems. At the main support Web site (**http://support.lindows.com**), you'll find a comprehensive list of FAQs, forum posts and an around the clock support hotline.

The Lycoris team provides a broader help base for its users called The Lycoris Greenhouse (**www.lycoris.org/index.php**). Based around the "community is power" premise, the site boasts discussion forums, community magazines, tutorials and FAQs to deliver a comprehensive "one-stop" help centre. One of the main features here is the Community Maintained Hardware Database: a listing of many different hardware brands and types that've been tested with the OS.

Xandros' offering is much the same as its competitors. In addition to a general support Web site (**http://support.xandros.com**), Xandros also provides online forums for users to ask and sound out advice on the distro. You'll also find links to FAQs, downloads and Xandros-related news items.

Distrowatch (**www.distrowatch.com**) covers 227 Linux distributions, including all the major players from Debian to Slackware. Each has a featured summary page listing the official product homepages and a host of other sites related to the distro. The documentation links are of special interest as they provide direct access to product-specific user guides and community home pages.

Also worth mentioning is the Sydney Linux Users Group. SLUG (**www.slug.org.au/sydney.html**) hosts various useful resources for the Linux beginner, such as setting up a wireless LAN and how to access broadband services.

NEXT STOP: FORUM TOWN

For users of more hands-on distros such as Mandrake, Red Hat and SuSE, quickstart guides and FAQs are only going to provide you with minor relief from your tech-aches and pains. Thankfully, there's a whole community of home-grown doctors at your service.

The LinuxForum (**www.linuxforum.com/index.php**) caters for users, developers and enthusiasts alike, and promises free Linux support regardless of the distribution you use. When you combine that promise with the Linux Shell Commands Library, Linux news and the huge range of "How to" guides, this site is sure to make your transition to Linux a lot smoother.

Linuxquestions (**www.linuxquestions.org**) promotes a similar service. Covering topics from security to installation and networking, the site's forums detail the main Linux distros plus user reviews of each distro.

FINAL DESTINATION: IRC CITY

Distributions further along the Linux spectrum such as Gentoo, Debian and Slackware are more advanced, requiring plenty of prior knowledge before they can be used effectively. Peer support is an essential part of obtaining help with these distributions, and IRC can greatly alleviate this burden.

There are dozens of IRC networks, many of which have entire channels focused on Linux. However, IRC channels are generally not support-oriented and instead focus on technical discussions of the product. A detailed list of available IRC channels such as EFNet, Undernet and DalNet can be found online at **www.linux.org/docs/irc.html**.

Top places to go for help

Where	Where	What
Distrowatch	http://distrowatch.com	Over 227 distros covered
LinuxForum	www.linuxforum.com	All major distros
LinuxQuestions	www.linuxquestions.org	Q&A-based discussions, all distros
JustLinux	www.justlinux.com	Bulletin board technical discussions
RPMSeek	www.rpmseek.com	Documentation, applications and forums
Linux online	www.linux.org	Applications, forums, documentation and news
LinuxForum's IRC	www.linuxforum.com/irc_channel.php	LinuxForum's free IRC channel
Debian IRC	www.debian.org/support#irc	IRC channels dedicated to Debian
Linux online's IRC list	www.linux.org/docs/irc.html	Comprehensive IRC list
Groups of Linux Users Everywhere	www.ssc.com/glue	Find a local Linux User Group or establish one yourself

Extreme agility

eXtreme Programming has emerged as a grassroots solution to software development cost blowouts. *Simon Sharwood* reports on a process that's turning the developing world upside down.

In October 2002, NSW treasurer Michael Egan asked his auditor-general to investigate a software development project at publicly-owned Sydney Water, Australia's largest water services provider.

Egan ordered the investigation because the project was haemorrhaging money without producing results. The original budget of $60 million had blown out to more than double that sum and disputes were erupting between Sydney Water and its suppliers. Yet the tax-paying citizens of NSW were no closer to the improved services the project was designed to deliver, adding a corporate governance dimension to the mess.

Sydney Water's software troubles are far from unique. In September 2003, Australian Red Cross Blood Services was reported to be smarting at a $38.9 million bill for a new application budgeted to cost just $4 million. Failures on this scale are an all-too-common occurrence, according to research company Standish, which estimates that just 34% of all corporate software development projects around the world are successful — a terrifying statistic given the importance of software to most businesses and the need for its swift implementation in the face of heated global competition.

A PROBLEM OF METHOD

When a project fails, the software development methodology used to guide it is often fingered as the ultimate villain. Methodologies are practical collections of best practices designed to provide a framework to see a project through to successful completion. Around the IT world, a number of well-tried methodologies are used to guide software development projects, all offering different ways to define the goals of a software development project and ways to work which are supposed to lead to success.

Too often, however, these methodologies don't deliver. Sometimes teams ignore them. On other projects, miscommunication of the original goals and poorly articulated objectives or ideas that can't be expressed using current technologies combine to undermine a methodology and scuttle a project.

In 1995, a typical failure of conventional methodologies got programmer Kent Beck thinking. Called in to rescue a payroll project for car manufacturer Chrysler, Beck quickly decided that the project was doomed if it persisted with conventional development methodologies and instead experimented with an entirely new set of work practices.

These new methods are alleged to have turned the project around. Beck quickly codified them as a methodology under the name eXtreme Programming (XP), which he outlined in a 1999 book *eXtreme Programming eXplained*.

XP's emergence helped shed light on several similar methodologies, and in 2001 their respective authors gathered to found the Agile Software Alliance and write its "Manifesto for Agile Software Development":

"We are uncovering better ways of developing software by doing it and helping others do it. Through this work we have come to value:

Individuals and interactions	over processes and tools
Working software	over comprehensive documentation
Customer collaboration	over contract negotiation
Responding to change	over following a plan

That is, while there is value in the items on the right, we value the items on the left more."

Another Agile mantra is its four values: communication, simplicity, feedback and courage.

Agile methods have since become all but mainstream. HP uses Agile methods and Macquarie Bank adopted the technique a year ago. Microsoft, Rational/IBM and Borland are all in favour of the techniques it espouses, with the latter two companies supporting it in its products.

Agile resources

Australia has at least three Agile groups who meet regularly:

1. The Sydney XP and Agile Methods Club targets practitioners for its monthly meetings.
   Details at: **http://groups.yahoo.com/group/SyXPAC**

2. The Melbourne XP enthusiasts group can be found at:
   http://groups.yahoo.com/group/melbourne_XP_enthusiasts

3. The Sydney Agile Methods Special Interest Group stages bi-monthly meetings featuring case studies from companies where Agile methods have been put to work and can be found at:
   www.softed.co.nz/samsig

Globally useful sites include:
www.agilemanifesto.com
www.xprogramming.com

The Agile bank

What does it take to adopt Agile programming? A willingness to improve the way you work and some flat-screen monitors, according to Macquarie Bank.

"We are always looking at ways to improve our effectiveness and had been aware of Agile methodologies," says Robin Mills, a division director who manages IT for the Banking and Property divisions of Macquarie Bank.

"We made an architectural decision to base our new developments on, and over time migrate our existing systems to, the J2EE platform. In doing this we were open to look at new development methods. We chose Agile as we were attracted to many of its aspects and we had access to [people with] expertise in the methodology."

The bank has used Agile methods extensively for over a year now, and is very happy with the quick production of quality software it has produced.

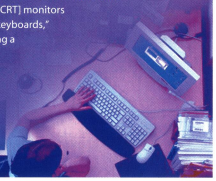
"Both the business and IT teams have embraced the methodology and have been happy with the outcomes," Mills says. He also believes the interactivity between business and IT demanded by the new method has strengthened the partnership between the two groups, and therefore delivered better outcomes.

Macquarie Bank's programmers have enjoyed the experience of pair programming too, although the practice is used occasionally instead of XP's suggestion that coders never work alone.

"You can sometimes worry that you're being paid to watch someone else typing," says technical architect Grant Gardner. "But when there is a problem to solve, you can get over it in five minutes working as a pair instead of taking hours to do it yourself. And the quality of the code is significantly higher."

Gardner's sometime partner Georgina Edwards, agrees. "With two pairs of eyes looking at code you can cover more scenarios."

Two pairs of hands, however, did create some early problems: "Our [CRT] monitors got in the way of the keyboards," Gardner recalls. Making a small investment in flat-panel technology and an open office layout are useful enhancements which have contributed to the bank's successes.



WHAT IS AGILE PROGRAMMING?

At the heart of Agile programming is the belief that conventional software development methodologies spend too much time on negotiation, design, planning and documentation and that the emphasis on these tasks is often counter-productive. Agile practitioners instead emphasise working to produce actual software, seeing this as a far better way to keep a project moving than creating a substantial specification to refer to when times get tough.

"For many organisations, the approach to software development has been to divide the problem into small enough chunks that you can assign one person to work on each of them in their own cubicle, then hope you can somehow bring it all back together," says Steve Hayes, founder of the Melbourne XP Enthusiasts Group and director of Agile methods consultancy Khatovar Technologies. Agile, by contrast, takes a "very humanistic approach which recognises that people develop software. . . and emphasises communication as the route to success."

XP offers fine examples of how Agile methods put communication at a premium. Among its 12 rules for software development is the requirement that the entire development team come together to plan software in the presence of a representative of the customer. Instead of dispersing to code, the team works in the same room, alongside the customer who remains onsite to answer questions as required. Programmers are also expected to work in pairs — two developers share a single computer and review each other's work as they code. Most importantly of all, work focuses on small releases of limited functionality so that the onsite customer can see real progress and detect any potentially harmful meanderings before they become damaging.

All code is regularly integrated into a complete build of the project, which itself is frequently tested, and coders work at a "sustainable pace".

DOES AGILE DELIVER?

For Martin Andrews, a developer and consultant with Thoughtworks, an organisation which mentors companies into Agile processes, Agile methods work extremely well.

"I enjoy Agile projects more than traditional projects because I love to code, not get bogged down with document-based deliverables," he says. "I love building solutions, to see them working, be encouraged to work with a client and see their pleasure when my work is good." Andrews also believes that client contact is a bonus for programmers, many of whom feel that confinement in the back rooms is a hand-brake on their careers.

Adam Cogan, chief architect and owner of Sydney's Superior Software for Windows (SSW) is another fan, as he believes XP delivers an advantage for his business. SSW suspects it has used Agile methods for several years. "When I read the 12 principles, I felt sure we were already using some of them," he says. "For us, it just made common sense. Our developers were all for it." So the company adopted XP, then adapted it to fit its own needs with its development method dubbed XPDM.

Today, the company offers XP and the waterfall methodology to its clients, but finds that XP often makes more sense.

"A client asked us for a fixed price of $100,000 on a project," Cogan recalls. "We said to them that we would use XP and

break it down into five projects of $20,000 each, which reduced their risk."

The client saw results within weeks, was impressed by the quality work produced and subsequently engaged SSW for work well beyond the initial project. "When you can meet a client's expectations after a month or so it gives them confidence in you," Cogan says.

CRITICS

Not everyone applauds Agile programming, however. Dr Jean-Guy Schneider and Dr Lorraine Johnston of Swinbourne University's Centre for Software Engineering (UK) worry that XP isn't an appropriate methodology to teach students, who they believe need more basic instruction if they're to emerge from their studies with the skills industry demands.

In a paper published in *Journal of Systems Software* in December 2003, the two write that "the code-centric view of eXtreme Programming makes it difficult to introduce practices which are needed for larger-scale systems. Furthermore, students generally do not have the necessary maturity to fully understand the practices and their respective consequences of Agile methodologies."

"Agile methods assume experienced people who can pull back from a problem," Schneider added in an interview with *APC*. "Less experienced people may lack the sixth sense to understand when things will go wrong… making it less likely their participation in an XP project will lead to success."

Extreme Programming Refactored: The Case Against XP (Matt Stephens and Doug Rosenberg, 2003) is also wary of the new methods.

The book contends that Beck's original XP project at Chrysler was actually a failure, crediting much of XP's profile to its adoption by dot com companies which saw it as a shortcut to success. The subsequent evaporation of these dot coms, they argue, tells you all you need to know about the fragility of XP which is labelled "inherently high-risk, brittle and prone to certain failure modes".

Other critics point out that Agile methods' reliance on close interaction precludes the larger team sizes necessary for the largest software projects, limiting its scalability. Others ask why so few implementations of XP and its other Agile cousins adopt all of its practices completely, suggesting that its incomplete implementation shows it up as a collection of useful tricks rather than a complete template for running a development project.

Agile advocates respond to this kind of criticism by insisting that they never claimed their work represented a silver bullet, instead offering alternatives to older methods with known high failure rates.

Yet for businesses where hundreds of millions of dollars are on the line and corporate governance is high on the agenda, Agile programming offers a new way to improve the relatively young discipline of developing software. And because it doesn't take a state treasurer to point out that current success rates are unsustainably bad or that innovation is the lifeblood of IT, Agile programming appears to be a subject we'll hear more about in coming years.

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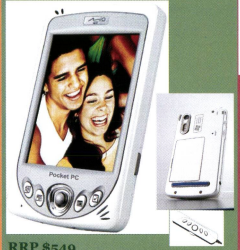

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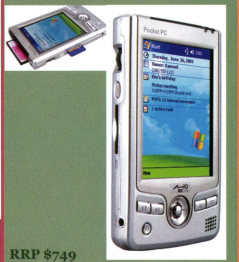

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WORKSHOP

Hands-on with hardware and software, plus bonus CD content

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Jarrod Spiga begins a four-part series on building communities using online journals, forums and news management tools.

116 Windows registry recovery
"Unrecoverable error" messages strike fear into the hearts of every computer user. But *Serdar Yegulalp* shows that all is not lost.

118 Upgrading to Windows SBS 2003
A reliable server is a vital part of a successful business. *Paul Schnackenberg* helps you upgrade to Small Business Server 2003.

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System restore is one of XP's hidden gems. It's a useful feature that you won't appreciate until you need it, and then it's a lifesaver. *Bert Smith* explains.

126 Emailing with handhelds
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130 Omnis Studio 3.2.1
David Williams shows you how to get up-and-running fast with Omnis Studio 3.2.1, a powerful and intuitive Web-based Rapid Application Development tool.

132 Server bandwith protection
Jarrod Spiga configures the Apache Web server to prevent others from stealing images and blowing out your bandwidth allocation.

134 Digital watermarking
Many people have concerns over the security of electronic communication. *David Emberton* illustrates how to keep prying eyes away.

Bonus CD software

Most Workshop articles are accompanied by bonus software loaded onto our cover CD set — just look for this icon. This is often software that's integral to the article. The selection ranges from full-working versions and trial versions, to shareware and freeware.

***APC* cannot provide tech support for these programs, but if you have a problem with the CD itself, by all means holler our way (see page 6 for details on how to contact our CD team).**

Site of the month

http://marsrovers.jpl.nasa.gov/home/index.html

Along with the failed European Beagle Rover, NASA's Mars Rovers have captured a lot of media attention over the last few months. NASA's Jet Propulsion Lab has set up a specific site for information and resources about its Spirit and Opportunity rovers that are packed with interesting information.

Not only can you download a plethora of images and video streams captured by the Rovers and staff on our terrestrial plane, there's a tonne of information being added every day. Live journals are regularly updated by both technical activity planner Jeff Norris and manager of the Navigation and Mission Design section, Michael Watkins — two of the staff who have a large say in exactly what the Rovers do on our second-nearest planetary neighbour. Those familiar with world clock applications might also enjoy the Mars24 application, showing the time on the planet along with locations of interest.

The sections cater to different interest groups. The Kids Fun Zone has flash animated games and activities that'll keep the young ones entertained, while the Students and Teachers area has vast amounts of educational info on the red planet.

Of course, there's much more to NASA than these latest missions. The main Jet Propulsion Lab site is worth a visit, along with other NASA agency sites.

All code fragments and examples given in Workshop articles are for demonstrative purposes only. Questions or comments? Email workshop@apcmag.com.

Creating an online community

Bonus CD software

PHP-Nuke 7.0, mySQL Database Server 4.0.17, mySQL Database Server 4.0.17, PHP: HyperText Pre processor 4.3.4 and phpMyAdmin.

***Jarrod Spiga* begins a four-part series on building communities using online journals, forums and news management tools.**

Being involved in online communities can be a lot of fun. What starts off as an innocent reply to a forum can quickly turn into a friendship with a group of people with a common interest.

Like any relationship, creating and maintaining an online community requires effort. Instead of just supplementing the stories submitted, you're responsible for creating a lot of the content on the site and ensuring that what's submitted is relevant. And you also have the role of mediator (or wrathful god) when politics surface.

CONSUMING PASSIONS

The most difficult aspect of building a site is rarely the technical side. Anyone can produce a Web site, but you'll need an idea that people can relate to in order to pull the hits, and you'll need to continually work on the site to keep them coming back.

The first thing you need is an idea to build your community around — a common set of interests to attract your core users. You'll need to be passionate about the idea. If you aren't, both you and your users will lose interest.

A unique idea is best, but not essential. If you're passionate about an idea existing sites are based around, why not add a twist? For example, the Nissan Silvia club (**www.nissansilvia.com**) and the Silvia Club of NSW (**www.silviansw.com**) are both online motor clubs, but while the former is a resource for Silvia owners, the latter focuses on the staging of regular events.

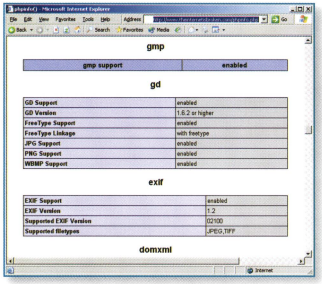
GETTING STARTED

Almost all communities have people who regularly contribute articles and information to the site. To maintain consistency, Content Management Systems (CMS) are used. PHP-Nuke is arguably the most common CMS, but there are a number of other systems freely available including NewsPro, OpenCMS, Post-Nuke and Slash (the code Slashdot is built on). You can use any of these, but this series of Workshops will revolve around PHP-Nuke.

To get PHP-Nuke running properly, you'll need to make sure PHP version 4.1.x is installed on your server, though it's best to have at least version 4.3.4. PHP 4.3.4 is included on this month's cover CD set, along with MySQL 4.0.17 and PHP-Nuke 7.0. To take advantage of the additional graphical security checks in PHP-Nuke 7, the GD2 extension must be available. To check this, use the command:

```
<?php
        phpinfo()
?>
```

By saving this script as phpinfo.php on your Web server, you'll be able to verify that PHP is properly installed and whether GD is installed. If GD isn't installed, uncomment the following line from your php.ini file:



▶ ***See your extensions:*** *the phpinfo() command shows what PHP extensions are available.*

```
extension=php_gd2.dll (if you're using Windows)

extension=php_gd2.os (if you're using a Unix-based OS)
```

If you're using a Windows-based Web server, ensure that index.php is included in the list of default home pages.

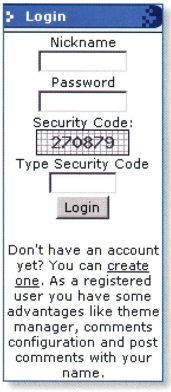
PHP-Nuke uses MySQL databases to store the data for your site, so confirm this is installed. It's possible to use other database software, but the included database schema must be converted. There are plenty of free SQL conversion utilities available on the Web.

The next step is to copy the required files to your HTML directory. Windows users can unpack the tar.gz file using WinZip, while users of Unix-type OSes will need to use the following command:

```
tar -xzvf PHP-Nuke-7.0.tar.gz
```

Files for the site are stored in the HTML subdirectory. Move them so they appear in the site root. Windows users can simply drag-and-drop; others should use the following Unix commands from a shell:

```
cd html
mv * ../
cd ..
rmdir html
```



▶ ***Virtual security:*** *graphical security codes prevent bots logging into your site.*

DATABASE LOCKDOWN

Windows users can make working with MySQL's command utilities easier by ensuring that the location of MySQL's binaries are in their path first. In the System applet in Control Panel, select Advanced > Environment Variables > System Variables > Path > Edit and add the path to the bin directory where you installed MySQL.

If you don't have access to a command line to do the work on the database, these steps can be completed using a Web-based database management utility such as phpMyAdmin.

It's imperative that the database is secure. Fresh installations of MySQL aren't that secure, so if you've done a fresh install, the next step is to add a root password to the database. This can be done from a command line by entering:

```
mysqladmin --user=root password <root password>
```

where <password> is the password you want to set. Next, flush all the privileges on your databases in order to set up the tables properly:

```
% mysql --user=root --password
Enter password: <root password>
Welcome to the MySQL monitor.  ...
... Type '\c' to clear the buffer.

mysql> DELETE FROM user WHERE Host='localhost' AND User='';
mysql> FLUSH PRIVILEGES;
mysql> QUIT
```

Once the database has been locked down in a general sense, it's time to create the database that PHP-Nuke will use:

```
% mysqladmin --user=root --password create <dbname>
Enter password: <root password>
```

<dbname> is the name you would like to call your database. It's good security practice to avoid logging in to anything as root as often as possible. All you need to do is create a new user in MySQL:

```
% mysql --user=root --password
Enter password: <root password>
Welcome to the MySQL monitor.  ...
... Type '\c' to clear the buffer.

mysql>    GRANT SELECT, INSERT, UPDATE, DELETE, CREATE, DROP,
INDEX, ALTER
    ->    ON <dbname>
    ->    TO <php-nuke username>@localhost
    ->    IDENTIFIED BY '<php-nuke password>';
mysql>    QUIT
```

<php-nuke username> is the username and <php-nuke password> is the associated password. Now it's time to import the Import PHP-Nuke Database schema. Change to the SQL directory located under the site's root directory and enter the command:

```
% mysql --user=<php-nuke username>
--password <dbname> < nuke.sql
Enter password: <php-nuke password>
```

NUKING YOUR DATABASE

Once the database schema is imported, PHP-Nuke must be told how to access the database. This is done by editing the config.php file located in the site root. In most cases, only the top portion of this file needs to be edited.

The $dbhost variable refers to the DNS or IP address of the server where the database is located. Large sites often have the database stored on a different server for security and performance reasons, but as the database is also on the Web server in this case, localhost is the appropriate setting.

The $dbuname variable refers to the username PHP-Nuke uses to access the database. This should be set to <php-nuke username>. Don't set it to root as this isn't secure. The $dbpass variable needs to be set to the password for this username — <php-nuke password> in this instance.

The username and password for the account are currently stored in plain text, at a publicly accessible location on the Web server. Security can be tightened here later (see page 114).

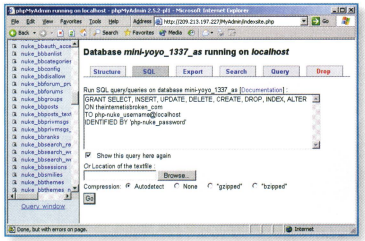
By setting the $dbname variable to <dbname>, PHP-Nuke is aware of the name of the database it should be using. If you only have limited databases at your disposal, the $prefix variable is invaluable. By adding a common prefix to all the tables in PHP-Nuke, the Nuke tables won't conflict with any other tables in the database. Since the database schema imported earlier uses the nuke prefix, this setting can remain as is.

If the database is already populated with a list of users, the $user_ prefix variable points to this table instead of the default user table. This allows sites which already have a users list to operate with PHP-Nuke, meaning that visitors can use their existing username and password to log in. (This table must be compatible with PHP-Nuke. For this exercise, leave it as is.)

The $dbtype variable should be set to the type of database being used. Unless you're using a different database server, this should be set to MySQL. The $sitekey variable can be anything you want. For security, change it to something unique to the site, but don't change it after this step — if you do, the database will be inaccessible.

The last variable to configure is $gfx_chk, the graphics check feature. This ensures robots or other scripts aren't automatically logging into your site. You can see this in operation

▶ **Web queries:** *if you don't have shell access, mySQL administration can be done through phpMyAdmin.*



in the login area of our example site (**www.theInternetis broken.com**). GD extensions must be working in order to use this feature. It's set to seven by default, making the graphics check a requirement for any user. More information is included in the config.php file.

Once you've made the appropriate changes to config.php, save the file and exit your editor. It's now time to test things out.

Fire up a Web browser, and load the admin.php page in your Web server's root directory (if you're using a browser on your Web server, **http://localhost/admin.php** should do the trick). If everything has gone smoothly, you'll be prompted to create the first administrator's account. Once you have created your account, you should be able to log in to the administrator's menu.

SECURING CONFIG.PHP

Config.php is presently located in the site's root directory where anyone can read it. Having the login details to your database stored in plain text within this file isn't exactly secure (even though the MySQL user is only set up to log in from the localhost), so the next step is to make this file inaccessible to the outside world.

The installation file says that securing the file should be as simple as moving the config.php file one level up in the directory hierarchy and using an include statement to refer to it. While this works for the core functionality of PHP-Nuke, most modules (including the bundled phpBB forums software) will fail since they expect to see config.php in the site's root directory.

To work around this, rename config.php to config.inc (the INC extension is an abbreviation of include). Then create a new config.php file and type the following script into it:

```
<?php
if (eregi("config.php",$_SERVER['PHP_SELF'])) {
        Header("Location: index.php");
        die();
}
require("config.inc");
?>
```

This script searches the headers of request sent to the Web server for the string 'config.php'. If found, the request is redirected to index.php, loading the site instead of returning the contents of config.php. The require statement includes the information in the config.inc file, allowing the site to load properly.

You can block the outside world from accessing all files with an INC extension. The easiest way to do this using the Apache Web server is via a .htaccess file. In your site root, create a file named .htaccess (note the full stop before htaccess) and enter the code:

```
<Filesmatch "\.inc">
        Order allow,deny
        Deny from all
</Filesmatch>
```

Blocking access under IIS is a little trickier. To do this, install the IIS Lockdown Wizard and use the URLScan tool to deny access to files with the INC extension via the use of the [DenyExtensions] directive in the URLScan.ini file. Instructions on how to install and use the Lockdown Wizard are at **http://support.microsoft.com /default.aspx?scid=kb;EN-US;325864**. Instructions for configuring URLScan are at **http://support.microsoft.com /default.aspx?scid=kb;EN-US;326444**.

WHERE TO FROM HERE?

The next thing to do is to get content on the site and define your place on the Web. PHP-Nuke has dozens of modules which we'll set up in future installments of this Workshop, but for the time being, log into the administration menu, click on the Modules button, and deactivate the AvantGo, Downloads, Surveys and WebMail modules.

Next, change the default message on your home page — click on the Message button in the administration menu and edit the current message. Mention the intention of the site, as well as offer a welcome message to the members of your new community.

Slashdot regulars will be familiar with the idea of topics. Your site will undoubtedly have a range of subjects which will appeal to sections of your community. PHP-Nuke can sort stories into these topics to make it easier for users to find relevant content.

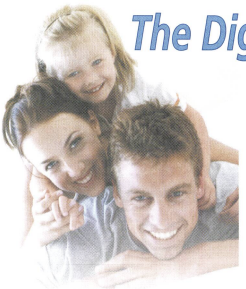
Add stories to the site via the Add Story button in the administration menu. Of course, members like to submit content of their own. They can do so through the Submit News link on the left side of your home page. Once someone has submitted a story, it awaits approval in the Submissions section of the administration menu. From here, you can approve or reject the submission.

If you want to fiddle around with the look and feel of your site, review the "Build sites worth seeing" workshop, (*APC* December 2003, page 126). In the meantime, start getting the content up. Update frequently to keep people coming back, stay fresh, make things interesting and appeal to your audience. APC

Next month

In the May issue, we'll show you how to set up forums, surveys and polls, establish newsletters and investigate other ways to facilitate interaction in your community.

The Digital Centre for Your Family



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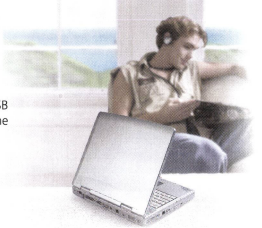

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Bonus CD software

ERUNT 1.1a and NTREGOPT 1.1a.

Back from the dead

"Unrecoverable error" messages strike fear into the hearts of every computer user. *Serdar Yegulalp* shows all is not lost.

Registry damage is arguably a Windows XP user's worst nightmare. It can result in bizarre behaviour or programs crashing nonsensically; or worse, an unbootable and potentially unrecoverable system, with a lot of wasted time, lost data, and the hassle of system rebuilding.

However, you can recover from such a disaster without starting again from scratch. In many cases it's possible to pick up exactly where you left off. There are also preventative measures you can take to have copies of the registry preserved elsewhere, or even offline if your system is exceptionally prone to damage.

SYMPTOMS OF THE SICKNESS

The first way to prevent registry damage is to recognise the symptoms. Where the system is unbootable, one of the following error messages may appear:

- Windows could not start because the following file is missing or corrupt: \WINDOWS\SYSTEM32\CONFIG\SYSTEM
- Windows could not start because the following file is missing or corrupt: \WINDOWS\SYSTEM32\CONFIG\SOFTWARE
- Stop: c0000218 (Registry File Failure) The registry cannot load the hive (file): \SystemRoot\System32\Config\SOFTWARE or its log or alternate

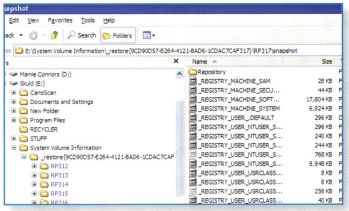
The files in question, system and software, are two of the five files stored on the system drive that comprise the registry. When Windows boots, these files are loaded into memory and then "locked"; the only way changes can be made is through the system APIs that make registry changes. Because of this, they can't be backed up or restored conventionally (that is, by simply copying them out when the system is running). There are ways to make backups of the registry (explored later in this article), but they require Microsoft-written or third-party tools to work correctly.

Despite these measures, it's possible for the registry to be damaged. The most common culprit is badly written software or drivers, especially software which uses low-level OS hooks (antivirus programs, for instance). If these programs crash without properly committing registry changes, the registry can become damaged. Viruses and hard disk or other hardware failures are other offenders.

ON THE ROAD TO RECOVERY

The first thing to try in the event of a damaged registry is to boot using the last known good configuration. At each successful boot, a backup copy of part of the registry is made and stored separately from the main registry files.

Last known good configuration's usefulness is limited. It only restores a backup of the registry key HKEY_LOCAL_MACHINE



▶ ***Life saver:*** *the System Volume Information directory contains backup copies of the registry, created at every system checkpoint.*

\System\CurrentControlSet; it doesn't repair changes made to software registry keys or user information. However, if the damage to the registry is limited to that branch (where the most recent changes to hardware drivers would be found, for instance), you may be able to roll back damage to that branch.

SHIFTING INTO MANUAL

Windows XP's System Restore function keeps a running log of changed system files, including the registry, which can — with some work — be restored manually in the event of a major disaster. Even if your existing registry is completely trashed, it's possible to pull out a full-working copy (including user data and installed program information) from the repository. The process is slightly tricky and requires that you have the Windows XP installation CD from which to boot to the Recovery Console.

If you have System Restore turned off on your system drive (never a good idea), this procedure won't work. The following instructions assume that Windows is installed in C:\windows. If Windows is in a different location, you will be given the directory location and drive where Windows is located once you enter the Recovery console, when you are asked to select a Windows installation to perform recovery on. (Note: the letter for the system drive in the Recovery Console sometimes isn't the same as when you boot to Windows itself, possibly due to the way Windows assigns drive letters for things like CD/DVD-ROMs.)

The first step is to restore the registry from a copy made when Windows was initially installed. This will make the system bootable.

1. Boot the Windows XP install CD and start the Recovery Console by pressing R from the startup menu. Select your current Windows XP installation and log in.
2. Type `md tmp` to create a new directory \tmp in C:\windows.
3. Type `copy c:\windows\system32\config\system c:\windows\tmp\system.bak` to copy the system registry hive file to the newly-created tmp directory.
4. Do the same with the files software, sam, security and default,

all located in C:\windows\system32\config. Each file should be copied to C:\windows\tmp with a BAK extension.

5. Type `delete c:\windows\system32\config\system` to delete the system registry hive file. In the same manner, delete software, sam, security and default.
6. Type `copy c:\windows\repair\system c:\windows\system32\config\system` to copy a backup copy of the system registry hive file into the config directory. This backup copy was created when your copy of Windows was first installed.
7. Do the same for software, sam, security and default, all of which should have backup copies in C:\windows\repair; copy them to C:\windows\system32\config.
8. Type exit to quit the Recovery Console and reboot the computer.

The next step is to retrieve a copy of the registry made by System Restore the last time your computer booted successfully.

9. Start the computer in safe mode by pressing F8 at boot time and selecting Safe Mode from the menu that appears.
10. Windows should boot normally. If Windows doesn't boot normally at this point, critical system files may have been damaged along with the registry. The best option is to create a parallel installation of Windows that can be used to recover user data. (This needs to be done on a separate partition if possible.)
11. Log in as Administrator. In Windows XP, the Administrator account is normally hidden from view in the logon screen. If you have the Use the Welcome screen turned off in User Options, you can type in Administrator as a logon name, but Windows XP Home doesn't allow the Administrator account to be logged in unless the system is booted in safe mode first. By default, the Administrator account has no password.
12. Open Windows Explorer and select Tools > Folder Options > View. Select Show hidden files and folders and clear the Hide protected operating system files checkbox. Answer Yes to any prompts and click OK to close the dialog.
13. You now need to access the System Volume Information folder on your system drive. This folder contains the System Restore information for that drive, and is hidden from users by having the folder not only marked as hidden, but set by default so that only the system can access the folder. The folder should appear in the root of the system drive (C:\System Volume Information), but dimmed, since it's a system folder and is usually hidden from view.
14. If your system drive is formatted as FAT32, you should simply be able to double-click on the folder to open it. However, if it's NTFS, you need to follow these steps to make the folder accessible by changing its permissions:
    - From the Start, Run dialog, type `cmd` to open a command line.
    - Type `cacls "c:\system volume information" /E /G <username>:F` and press Enter. For `<username>`, substitute the name of the currently logged in user (usually Administrator). This uses the cacls tool to modify the folder's access information and gives the current user full permission over the directory.
15. Open the System Volume Information folder through Explorer. This folder contains one or more folders with the name _restore<GUID>, such as _restore{87BD3667-3246-476B-923F-FB6E30B3E7F8}. Each of these is a system restore point. Select the folder with the time/date stamp closest to the date you want to restore from and open it.
16. Within the _restore folder will be one or more folders with the name RP<number>, such as RP1, RP2, and so on. These are repositories of changed files, made after each successful boot or shutdown. Choose the folder with the time/date stamp closest to where you want to restore from, and open it. Do not use the most recent folder; go back to the folder stamped with a date just before your problems started. Otherwise you run the risk of restoring a damaged copy of the registry.
17. Within the RP folder is a folder labelled Snapshot which contains the following files: _REGISTRY_USER_.DEFAULT, _REGISTRY_MACHINE_SECURITY. _REGISTRY_MACHINE_SOFTWARE, _REGISTRY_MACHINE_SYSTEM, and _REGISTRY_MACHINE_SAM. Each of these is an image of the files that make up the registry from the time the snapshot was made. Most of the time these snapshots are automatically made by the system.
18. Copy each of these files to the C:\windows\tmp folder and rename them so that _REGISTRY_USER_.DEFAULT is simply default, _REGISTRY_MACHINE_SECURITY is simply security, and so on.
19. Shut the system down and reboot to the Recovery Console.

The final step is to place the backup copies of the registry files back into the system, and to roll the system back to an appropriate recovery point.

20. In the Recovery Console, delete the files sam, security, software, default and system from the directory C:\windows\system32\config.
21. Copy the same files — sam, security, software, default and system — from C:\windows\tmp to c:\windows\system32\config.
22. Reboot the computer normally. At this point the computer should restart properly, with all of its software and user settings restored.
23. Under Start > All Programs > Accessories > System Tools > System Restore. Choose the most recent System Checkpoint before disaster occurred and roll the machine back to that state. This is done to preserve the overall integrity of the system, since manually restoring the registry can create inconsistencies that prevent programs from working or damage Product Activation.
24. Reboot as prompted.

After this reboot you should be back where you left off. If you haven't got a recent backup of your most critical files, now would be a good time to make one — just in case!

Doing the business

A reliable server is a vital part of a successful business. *Paul Schnackenburg* helps you upgrade to Small Business Server 2003.

Upgrading such a crucial part of a company's infrastructure as the server is not a task to be taken lightly. There are many potential stumbling blocks, but a good plan will ensure you've spotted them before you start.

The first choice to make is whether to upgrade or migrate. An upgrade involves an existing server making the move to SBS 2003; migration transports data and settings from an old server to a new one. If your server runs SBS 4.5, you have no choice but to migrate. If you're running SBS 2000, Windows 2000 Server or Windows Server 2003 you can either upgrade or migrate.

Upgrading is the easiest and least time-consuming option if you already have SBS 2000 running well on solid hardware. Take into account the age of the server: an SBS 2000 server might have the capacity to run SBS 2003, but if it's three- or four-years-old it could be replaced with new gear.

The next step is to evaluate the hardware. If you're upgrading you need to make sure that your server can handle SBS 2003 comfortably. Check:

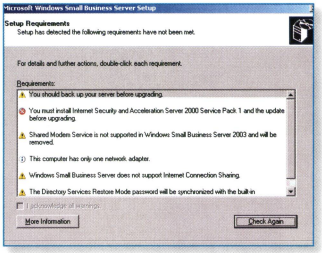
- RAM: at least 384MB, go for 1GB at least (maximum 4GB).
- CPU: at least 550MHz.
- Hard drives and partitions: 6GB plus data storage minimum.
- Network card(s), brand, type and speed.
- Backup unit.
- Hardware RAID, brand, type and configuration.

Verify that the network card, RAID setup, backup unit and video card all work with Windows Server 2003. Check each in the Windows server catalogue (which has replaced the HCL) at **www.microsoft.com/windows/catalog/server**. If your hardware isn't listed in the catalogue, don't despair. Simply visit the manufacturer's Web site and look for updated drivers; they are most likely available but not yet officially tested by Microsoft.

The next issue to consider is software. Third party software needs to be compatible with Windows Server 2003. Pay close attention to antivirus software — ensure it's compatible with Exchange 2003, not just Windows Server 2003. We used eTrust Antivirus 7.0 from Computer Associates and Symantec AntiVirus Small Business Edition 8.1 with Mail Security on production SBS 2003 servers; both work flawlessly with SBS 2003. Note: it's impossible to run two SBS boxes on the same network simultaneously.

Upgrade checklist

- **At least 384MB of RAM is recommended.**
- **Shared modem service will be removed (not available in Small Business Server 2003).**
- **More than two physical CPUs are not supported.**
- **Purchase SBS upgrade CALs if you have more than five users.**
- **Back up your server before upgrading.**



▶ ***Blocking issues and warnings:*** *attend to each before proceeding.*

PREPARATION

Before undertaking any major upgrade it's a good idea to do some disk maintenance. The first task is a disk clean up to get rid of old temporary files and other debris. Go to Start > Run and type in Cleanmgr then choose OK. Allow ample time for this function to complete.

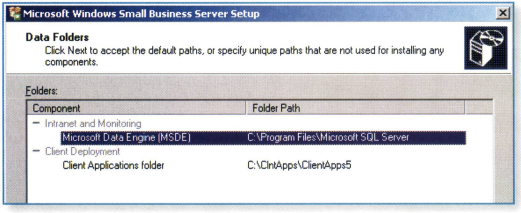
Once this is done we recommend a full Checkdisk for each partition on your system. Right click the drive in My Computer > Properties > Tools > Check Now and tick both boxes. If this is a system drive, Windows won't be able to run the check while the system is up and you'll need to reboot at a convenient time. Lastly, defragment all partitions. Go to Tools for the drive, choose Defragment Now and click Defragment.

Perform a full backup of the entire system and then verify the backup. If you use the built in NTBackup program in Windows 2000 make sure to choose all local partitions (except for the M: drive) as well as System State and the Exchange First Storage Group. Also check that the type of backup is Normal as the program remembers any earlier manual backups types as the default.

The M: drive is the file system representation of the Exchange mail and public folder database and as such should never be backed up or scanned for viruses. Doing so can cause data corruption.

As good as the NTBackup program is, we've had mixed results using it to restore a server from scratch. At best, it's a tedious process.

▶ ***Don't fill up:*** *choose the right place for the files.*



If an upgrade really failed (say through a power outage), Windows 2000 would have to be installed with the same computer name and settings as the original server. Then the full backup, AD, DHCP, WINS, Exchange and possibly SQL server would have to be restored.

However, there are better options than this. You can use a variety of disk-imaging programs to take a complete snapshot of the entire server, which can be restored in one step. We tested Symantec (formerly PowerQuest) V2i Protector 2 Small Business Edition and Symantec Ghost 8; both programs take images while the server is running and have a host of other features. Their high price tags (starting from $1,300 and $590 respectively) might preclude them from being used solely for this task, but they are great disaster recovery and backup solutions in their own right. Check the type of your disk-imaging program, as there are often workstation and more expensive server versions.

At this stage you should update virus signatures and scan the entire server (except for the M: drive).

SETUP

The setup program has been vastly improved. It checks hardware and software requirements much more thoroughly and gives a list of issues to attend to before proceeding with the upgrade.

One of the most important things to check is whether the server is running Service Pack 1 for SBS 2000. To do this, start the Small Business Server administrator console, and then go to Server Status (BackOffice Home). Click About in the Details pane — your version should be 2000 with Service Pack 1.

If it's not already installed, download it or order a CD (**www.microsoft.com/sbserver/downloads/sp1a.asp**) and install it before going ahead (the download is around 300MB). SP1a has the same content as SP1 except Windows 2000 SP4 is included, not SP3.

A lot of free disk space on the system partition is needed on the server. About 2GB is used temporarily by the upgrade program but a full installation of SBS 2003 takes up more space on the C: drive than SBS 2000.

Check if you have any third party applications running as services which log in as LocalSystem. If so, these should be stopped and their start up type changed to Disabled. Right click on My Computer, go to Manage > Services and Applications. Double click on each service, click Stop and change the startup type to Disabled.

Uninstall the Windows 2000 Administration tools if they are installed. Next install ISA server hotfix number 255 to enable ISA to run on Windows Server 2003. Download it from **www.microsoft.com/ISAServer**. Disable any real-time antivirus scanning on the server for the duration of the upgrade.

Inform all users of the upgrade and ask them to log off. In a larger network you might want to use the Net Send command to do this. Click Start > Run, type in CMD and click OK. Type in Net Send /? for a list of options for this command.

INSTALLATION

Now that you are ready to start the installation, insert CD 1 or the DVD. The setup program will start automatically and present a list of issues. The most common are:

- Blocking issues — the right service packs need to be installed. Exchange needs Service Pack 3 (which is not included on the SBS 2003 media), ISA server needs SP1 (also not included) and the hotfix to run on Windows Server 2003. SBS 2000 needs to have SP1, which includes the above service packs. SQL server, if installed, needs SP3 (which is included on the Premium technology CD). Windows 2000 needs at least SP3 but SP4 is recommended; it's included on CD3.
- The server requires at least 256MB of RAM.
- MS Mail Connector, Connector for Lotus ccMail, Exchange Instant Messaging (can't run on Exchange 2003) and Exchange Chat Service must be uninstalled and then reinstalled after the upgrade.
- If upgrading from Windows 2000/2003 DC, all five operations master roles must be assigned to the server (previously known as FSMO roles).
- You must reset your CALs to 5 if you're upgrading from a Windows 2000/2003 Server and then install SBS CALs after the upgrade.

Further reading

Upgrading to Windows Small Business Server 2003:
www.microsoft.com/WindowsServer2003/sbs/upgrade/default.mspx

Migrating from Small Business Server 2000 or Windows 2000 Server to Windows Small Business Server 2003:
http://go.microsoft.com/fwlink/?LinkId=16414

Upgrade Requirement Messages for Windows Small Business Server 2003 Setup:
www.microsoft.com/windowsserver2003/sbs/techinfo/productdoc/alpha.mspx

Upgrade Requirement Messages for Windows Small Business Server 2003 Setup:
http://go.microsoft.com/fwlink/?LinkId=16415

▶ ***Tick the right boxes:*** *a full backup of the entire server makes for a good insurance policy.*

■ Only one SBS server can run on the network. If you're doing a migration, only the server you're migrating from can exist in the domain.

Once any blocking issues have been attended to, the warnings can be acknowledged and setup continued. From here on the upgrade is fairly automatic. First Windows will upgrade to 2003 and then the OS will configure with SBS-specific settings. The next step is the installation of server applications: Exchange, Windows Share Point Services and so on. Finally, the new improved To Do list appears giving the opportunity to finalise the server's configuration. Remember to go to the licence section in Server Management and add or upgrade CALs.

Don't forget to restart any third party services disabled temporarily for the upgrade and change their startup type to Automatic. Reconnect the network to the Internet and enable your antivirus software.

MIGRATING THE OFFICIAL WAY

There are two ways of moving to a new server: the official Microsoft way and the shortcut way. We'll start off with the official line. These steps are for migrating from SBS 2000 to 2003 but the steps for an SBS 4.5 migration are almost identical (see "Further Reading", page 119).

Turn off your SBS 2000 server while installing the new server. Make sure to choose a different DNS and NetBIOS name for the new server, as well as a new domain name.

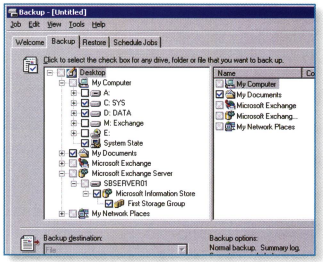
Configure the new (destination) server with an IP address in the same range as the old (source) server. The Active Directory Migration Tool (ADMT) is employed to move user, group and computer accounts from the source server to the destination server. The Exchange Migration Wizard is used to move mailboxes to the new server.

Now start the old server and do a full backup. Upgrade antivirus signatures and do a full scan of the source server before the migration. Document any custom settings in SBS 2000 for the SMTP connector, DHCP scope options, any static DNS records, RRAS server settings, Group Policy configurations and ISA Server settings.

Also record the DNS and NetBIOS name of the old server and domain. If the administrator account name has been changed, it needs to be renamed Administrator. The password for the administrator account needs to be the same on both servers. Record the location of the Users' shared folders, the Clientapps folder, the company shared folder and any other shared folders you have added.

If you use the Microsoft Connector for POP3 mailboxes, record the settings for each account configured. In the Small Business Server Administrator Console, double click your Exchange organisation and click on Connectors. Right click Connector for POP3 mailboxes, choose Properties > Connect and Download tab, click an account name, then click Edit. Record all settings. Custom recipients in Exchange and custom distribution lists should also be documented.

The Exchange Migration Wizard doesn't move public folders or the administrator mailbox so if public folders are used, go to a



client computer, start Outlook and export each public folder and the administrator account mailbox to a PST file.

Make sure the source server is running all the appropriate service packs (see page 119). This is also a good time to ask users to clean out old emails (they can be archived to a PST file) and old documents (perhaps archived on a CD-R).

Start the migration by disabling the DHCP service on the source server, disconnect the network from the Internet, and then install ADMT on the destination server — it's on CD 1 in \I386 \Admt\Admigration.msi. If there are NT4 member servers or NT4 workstations on the network, run these two commands on the destination server:

```
Net Localgroup "Pre-Windows 2000 Compatible Access" Everyone /Add
Net Localgroup "Pre-Windows 2000 Compatible Access" "Anonymous
Logon" /Add
```

To allow the servers to find each other you'll need to configure the source server with the destination server as a DNS forwarder server and vice versa. On the source server, go to the DNS console, right click on your source server, go to Properties > Forwarders. Enable forwarders and put in the IP address of the new server. On the new server, click New on the Forwarders tab and enter the full internal DNS name for the source domain. Add in the source server in the Selected domain's forwarders IP address list.

Start ADMT from the command prompt by entering:

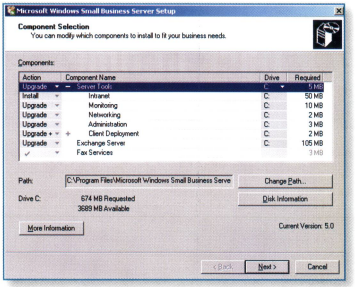
```
Runas /Netonly /user:Sourcedomainname\Administrator ?Mmc\
?%ProgramFiles%\Active Directory Migration Tool\Migrator.msc\? ?
```

We recommend running ADMT in test mode — the log files can then be examined and any problems attended to before running the actual migration.

The settings to configure in ADMT are beyond the scope of this article, for further details see the document "Migrating from Small Business Server 2000 or Windows 2000 Server to Windows Small Business Server 2003" (**http://go.microsoft.com/fwlink/?LinkId=16414**).

Next up is the migration of Exchange mailboxes. In the Administrator Console on the source server, double click on your Exchange organisation. Now double click on Servers, then your

▶ ***Your choice:*** *here are the different components you can select.*



server and finally First Storage group. Right click the mailbox store, select Properties and go to the Limits tab. If the settings are anything other than 175MB warning and 200MB limit for sending, update your destination server with those values.

Start the Exchange Migration Wizard from Start > Programs > Microsoft Exchange > Deployment and select Migrate to a computer running Exchange Server. Uncheck the Exchange 5.5 box in the Source Exchange Server dialog; enter the computer name of the source server and the administrator user name and password. Choose the accounts to migrate and select \MyBusiness\Users\ SBSUsers as the destination.

Proceed to copy the user's shared folders and any other shared folders from the source server. You can use either Explorer or the Xcopy command:

```
Xcopy \\SourceServerName\Users \\DestinationServerName\Users /e /o /d
/h /v /c>>C:\Copyresults.txt
```

If custom Web sites have been added to IIS, use the IIS Migration Tool to transport these sites to the destination server. Download the program at **www.microsoft.com/windowsserver2003/iis/downloads/default.mspx**.

To finalise the configuration on the new server, go to Server Management > Users > Change User Permissions. On the Template Selection page choose an SBS 2003 template for each user account that you migrated. Leave the Replace any previous permissions granted to the users setting.

In Server Management select Client Computers, choose Assign Applications to Client Computers and add applications to your Windows 2000/XP client computers.

You will have to manually configure the Exchange Server settings on each client computer — go to Control Panel, Mail and enter the new server name.

If ISA is running on the new server its name and port 8080 needs to be entered in Internet Explorer on each client computer. Go to Tools > Internet Options > Connections tab > LAN Settings.

Now re-enable antivirus scanning on the server plus all client computers and reconnect the network to the Internet. Remove the DNS forwarder configured on the new server, and remove the NT4 permissions if added for the migration:

```
Net Localgroup "Pre-Windows 2000 Compatible Access" Everyone /Delete
Net Localgroup "Pre-Windows 2000 Compatible Access" "Anonymous
Logon" /Delete
```

You can now uninstall ADMT on the new server and retire your old server.

MIGRATING THE SHORTCUT WAY

The long migration process is appropriate if you have a large network. If you have only a few users, there is a much quicker and straightforward way: all you need do is create new user, group and computer accounts.

Do all the preparatory steps for the migration and then export each user's mailbox content to a PST file. In Outlook, go to File > New > create a PST file and name it. Then go to File > Import and Export and choose export to a file; select the mailbox and then tick Include subfolders. Choose your new PST file as the destination.

Disconnect each client computer from the domain and make them members of a workgroup. Join each client computer to the new domain, reconfigure Outlook (as explained earlier) for the new Exchange Server and then import the information from the PST file you created into each user's mailbox.

Copy all shared data across using Xcopy and then recreate all custom settings for DNS, DHCP scope options, Exchange connectors, RRAS server, Group Policy configurations and ISA Server. Copy all roaming profiles and settings to a local user account before the migration. Then copy them back as roaming profiles once they are joined to the new domain.

This is a more manual approach, but in our experience, it can significantly cut migration time.

INSTANT MESSAGING — WHERE DID IT GO?

The instant messaging server function in Exchange 2000 was deleted from Exchange 2003 and thus from SBS 2003. For large corporations this isn't a big problem as they can keep an Exchange 2000 IM Server running in their Exchange 2003 environment; but what can be done on an SBS server?

One option is to use one of the free instant messaging services such as ICQ, MSN Messenger or Yahoo! Messenger. This does have some drawbacks though; extra traffic over the Internet connection can be costly. The added risk of malware entering the network also has to be taken into consideration. Most importantly, potentially sensitive company information will be sent over the Internet without any security. For some small businesses this could be an acceptable risk; for others it isn't.

Then there's Jabber (**www.jabber.com**), a familiar program to many IM users as it connects to several different IM networks (see *APC* July 2003, page 134). Jabber clients are free and the server is also free, at least if you run it on a Linux box.

There's also a wealth of single purpose IM programs out there. Our tests of LeadMind Development's Popmessenger (**www.leadmind.com**) gave good results.

Back in time. . .

System restore is one of XP's hidden gems. It's a useful feature that you won't appreciate until you need it, and then it's a lifesaver. *Bert Smith* explains.

It happens every once in a while: you'll install a shareware or freeware or upgrade a driver application, find it doesn't work, and then discover it's made a mess of the registry and rendered the system unstable. Or even worse, you can't boot the system anymore.

SYSTEM RESTORE FOR DUMMIES

System Restore is installed and enabled by default in XP and provides an escape route from serious trouble. It allows administrators to restore system files to a previous state without losing personal files, such as Word documents, spreadsheets and email. System Restore isn't designed as a substitute for a good backup procedure and doesn't backup anything other than system settings. It's actually quite handy for backing up registry information, as the export function found in XP's Regedit doesn't perform a complete backup, making it much safer to rely on System Restore.

The System Restore data file takes a maximum of 12% of disk space depending on the size of the volume (12% is for drives larger than 4GB). You probably don't need System Restore active on partitions other than your system/boot partition (usually C:\), unless you're installing programs to other partitions.

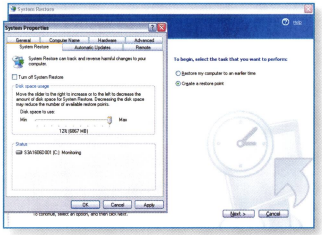
If your machine is fitted with a small capacity hard disk, and you're concerned about the space allocated for Restore Points, you can control this by right-clicking on My Computer, selecting Properties > System Restore > Settings. Be warned: if you assign less than 200MB, you'll only have enough free space for a few days' worth of Restore Points. You should really allot at least a gigabyte.

System snapshots, or Restore Points, should automatically be created every 24 hours, or at times of significant system events, such as an unsigned driver installation or the installation of XP-aware software. The installation of an unsigned driver should always create a Restore Point, but at times you'll find an expected automatic Restore Point hasn't occurred. A lot of valuable information about System Restore is available from Microsoft: **http://msdn.microsoft.com/msdnmag/issues/01/12/XPKernel/default.aspx**.

TROUBLESHOOTING

To check your system is automatically creating Restore Points, fire up System Restore by clicking on Start > Programs > Accessories > System Tools > System Restore. Once inside the program, check to see if any calendar dates are highlighted. If none are, no Restore Points have been created. There are many possible reasons for this scenario.

By default, snapshots are taken every 24 hours, so it could be that insufficient time has elapsed since the last Restore Point was created. Disk, mouse or keyboard activity can lead the computer to think that it's in use, which prevents System Restore from automatically



▶ ***Do it yourself:*** *don't wait for the system to make a Restore Point for you — create one manually.*

creating a Restore Point. A disk-intensive program working in the background (such as a screensaver) can interfere with snapshot creation. In this case, you need to turn off background programs such as these to allow for the creation of an automatic Restore Point.

DO IT MANUALLY

Rather than rely on automatic snapshots, you can manually create them by going to System Restore and selecting Create a restore point. It's best to create a manual Restore Point before installing any software, even if the software declares itself to be "Windows XP-aware". The installation of software using Windows Installer or Install Shield Pro version 7.0 (or later) should cause System Restore to create a Restore Point, but having two current Restore Points is infinitely better than having none. Before you do, though, there are a few things to bear in mind:

- You'll need a minimum of 200MB of free disk space on each partition you're backing up. A non-system partition with less than 50MB of free space can cause the suspension of System Restore across the entire system.
- A copy, delete or modify operation made to a file monitored by System Restore may also cause it to suspend across the system, so don't create a restore point with files open.
- Task Scheduler must be working for System Restore to make automatic Restore Points, even though (oddly) System Restore doesn't appear as a scheduled task. Go to Control Panel > Performance and Maintenance > Scheduled Tasks and look in the Advanced Menu. If it says "Start Using . . .", click that so "Stop using . . ." is shown.
  Alternatively, run the Net Start command from a command prompt and check that Task Scheduler and System Restore are both listed in the ensuing screen dump. To turn it on, go to Administrative Tools, and double-click Computer Management. Click the +

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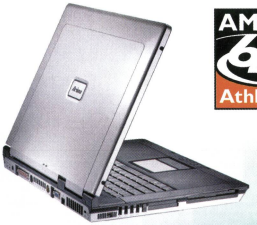

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symbol next to Services and Applications in the left window, and then click Services. Right-click System Restore to bring up Properties. Check that the Start Up type is set to Automatic and that Service Status is shown as having started. If necessary, click Apply and then OK.

RESTORATION

Restoring a previously saved state is as simple as opening up System Restore and clicking "...". Follow the onscreen instructions — the process is generally straightforward. Take note that Windows XP passwords and hints aren't restored in a restore operation. However, program passwords, such as for Windows Messenger, are restored. Domain and computer passwords are cached and restored by System Restore, but it doesn't maintain compression on files or folders.

Registry, profiles (local only — roaming user profiles aren't affected by restore), COM+ DB, WFP .dll cache and WMI DB IIS metabase file types monitored by System Restore as specified in the SDK document and Monitored File Extensions are all restored in a restore operation. A good reference is **http://msdn.microsoft.com/library/default.asp?url=/library/en-us/sr/sr/monitored_file_extensions.asp**.

Be warned: a restore operation may wipe files you want to keep if you've saved older versions into the snapshot. Place downloaded executable files, DLL files and any other files at risk in the My Documents folder where they'll be safe from any restore operation.

Every so often, System Restore will cause an error and won't behave as expected. The first thing you should do is check that you're logged in as Administrator. A limited user can't restore the computer to an earlier time, although they can create Restore Points if they're logged in.

If an improper shutdown occurred while System Restore was adding an entry for a file in its change log for tracking purposes, it's likely that the Restore Point is corrupted. The clearest signal is a message during a restore operation stating "Restore was incomplete", or similar. Select Turn off System Restore on all drives, click OK, and then click Yes. Reboot your computer and follow the same steps, but instead uncheck the Turn off System Restore on all drives option.

If a restore operation gives an error message such as "The procedure entry point RemoteAssistPrepareSystemRestore could not be located in the dynamic link library WINSTA.dll" when your system is about to reboot, clear all Restore Points and let the program start afresh. One way of doing this is to go to System Restore, check Disable System Restore, click OK, and then reboot.

After the system has restarted, enable it again, and a new RP will be created on reboot. Alternatively, go to Start/Run services.msc, locate the System Restore service and double-click it. Click Stop, and then set the start up type dropdown to disabled, click Apply/OK, then reboot. Reverse these steps to restart System Restore.

System Restore can also be disabled from the settings in Welcome to System Restore. To reinstall System Restore, make sure hidden files are visible in Windows Explorer, then navigate to \Windows\Inf\, right-click on System Restore.inf, and select Install. Once again, on reboot a new Restore Point will be created.

Note that the Restore Points exist as a "chain" of snapshots. This means that you can't delete one Restore Point without breaking the chain. However, you can free up disk space by removing all but the most recent restore point. Start > Programs > Accessories > System Tools > Disk Cleanup > More Options is the path to follow.

Don't forget to use XP's built-in Help and Support if you want quick System Restore reference material, but more troubleshooting details can be found at **http://support.microsoft.com/default.aspx?scid=kb;en-us;Q302796&ID=kb;en-us;Q302796**.

PLAYING IT SAFE

System Restore is available in both normal and safe modes of operation, but it can't perform a backup when the system is in safe mode. However, it can restore from there. If you can't boot the system and want to run the System Restore utility, boot into minimal safe mode, log on with administrator privileges and type:

```
%systemroot%\system32\restore\rstrui.exe
```

from the command prompt. Then press Enter and follow the onscreen instructions.

Another limitation is the inability to start System Restore from the Recovery Console. This means that no system changes carried out in the Recovery Console will be monitored, or recoverable, using System Restore.

CALL FOR THE SCRIPTWRITER

System Restore can be scripted. For details, see **www.microsoft.com/windowsxp/pro/techinfo/productdoc/scriptsamples.asp**. From Microsoft MVP Doug Knox's Web site at **www.dougknox.com**, you can obtain a useful VBScript to run an unattended Restore Point creation as a scheduled task. There are also some scripts worth looking at in **www.billsway.com/notes_public/WinXP_Tweaks**.

LET IT BE

Unless you have a reliable third-party substitute for System Restore, keep it active. It isn't a panacea for all software problems (this was never Microsoft's intention), but thankfully it's much improved over the version found in Windows Me. System Restore's major benefit is that if you accidentally delete monitored files, or if your monitored file types become corrupted, there's a good chance of being able to restore your system to a known, fully-functional state. Without it, you may have to reinstall an application, or worse, your operating system.

The advantages of using System Restore greatly outweigh the perceived shortcomings of consuming disk space and the cause of additional file fragmentation. Hard drives are cheap and you can defrag often. It's the data on your drive that's harder to replace. EOT

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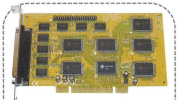

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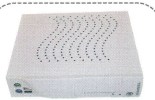

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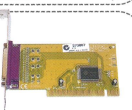

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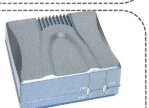

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Mail on the move

***Jenneth Orantia* demonstrates how you can make the most of your downtime by using your PDA to handle email on the go.**

Staying in control of your inbox can be a challenging and time consuming business, thanks in no small part to today's spam epidemic. The time spent reading, replying to and sorting email while on the job — anything from a few minutes to a few hours each day — could be better utilised working on those all-important deadlines.

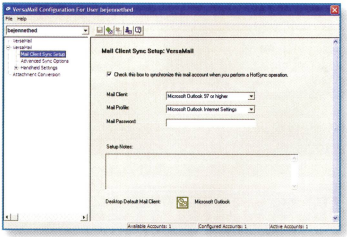
A more time-efficient solution to keeping a handle on your email is to manage as much correspondence as possible while away from the desk with your PDA. You don't even need to be connected to the Internet to do it. Instead, you can transfer all the email in your desktop mail program to your PDA, read and reply to them, and then have the email program send out your replies automatically during the next PC synchronisation.

Of course, having a wireless connection to the Internet is also handy — it means you can bypass your PC altogether and download email directly onto your handheld. This is particularly convenient if you're away from your PC for extended periods. If you have a Wi-Fi enabled PDA, or a handheld and GPRS mobile with Bluetooth, it's as easy as establishing the wireless connection, firing up the email program and downloading new email.

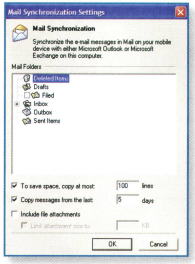
A NEW OUTLOOK

Most PDAs have built-in email clients that are capable of both on- and offline email handling. All Pocket PCs feature the Inbox application, which is a scaled down version of Microsoft Outlook on the desktop. This can handle POP and IMAP email accounts, as well as SSL connections to corporate mail servers. However, it can't display HTML mail and only synchronises with Microsoft Outlook. Additionally, those wanting to download email from Web-based accounts like Hotmail and Yahoo! have to jump through a few hoops to get it working.

The latest palmOne-branded handhelds bundle the VersaMail application, which has a more robust feature set. In addition to supporting POP, IMAP, corporate email and Web-based accounts, it displays basic HTML mail and supports synchronisation with a wide range of desktop email applications, including Microsoft Outlook, Lotus Notes, Outlook Express and Eudora.



Set to synchronise: *VersaMail can download email from a variety of desktop mail programs.*



An active transfer: *transferring email from Outlook to Inbox is simple using ActiveSync.*

OFFLINE VIEWING

For transferring email from a desktop email client to the Palm, VersaMail does the job adequately. Configuration consists of clicking on the HotSync icon and selecting Custom to bring up a list of the Palm conduits. Select VersaMail > Change. On the left hand side is a list of the accounts, including the default VersaMail account. Expand that account and click on the Mail Client Sync Setup. Tick the box labelled "Check this box to Synchronise" and select your Mail Client from the drop-down list. Then select the Mail Profile you use and insert the Mail Password (if there is one).

The Advanced Sync Options provide additional settings such as maximum message size, days of mail to synchronise and whether to download attachments. When you finish configuring all of the options, save your settings. On your next HotSync, all the email within the parameters you specified should download onto your device.

Setting up the Inbox program to grab Outlook email is fairly straighforward. Open Microsoft ActiveSync and click on Tools. In the list of services, check Inbox and click on Settings. This presents a list of mail folders, as well as options for the number of days of email to download and whether to include file attachments. The list of mail folders allows you to control which folders in your inbox are synchronised to your Pocket PC. However HTML emails aren't supported — instead, these are converted to text format. Additionally, if you have an ActiveSync partnership with two computers (such as home and work), you can only synchronise email from the PC used in the first partnership.

Those wanting to sync email from another desktop email client to their Pocket PC can use an alternative synchronisation program like IntelliSync (**www.pumatech.com**). This provides support for programs such as Lotus Notes, Outlook Express, ACT! and Novell Groupwise.

JUMPING ONLINE

When it comes to downloading email wirelessly, there are several third party email programs for the Palm that are superior to VersaMail. SnapperMail (**www.snappermail.com**) is a popular choice, due to its intuitive interface and extensive attachment support. However, it doesn't connect to Web-based email services or IMAP accounts.

Another option for Palm users is the Aileron Personal Access service (**www.corsoft.com**). As opposed to VersaMail and SnapperMail, which are standalone email clients, Aileron combines an email client with access to their servers. For an annual fee, it supports POP, IMAP, MSN/Hotmail, Yahoo! and AOL email account access (including attachments), as well as SMTP services for outbound messaging.

While Inbox is capable of downloading email wirelessly, the lack of support for HTML email or Web-based accounts makes alternative programs more appealing. The latter deficiency can be remedied with the Pocket Inbox plug-in OneMail (**www.net.worth.com.hk/onemail**) — also available for the Palm — , which supports Yahoo!, MSN, Hotmail and AOL email, and also converts HTML email to text. If you only want to access an MSN or Hotmail account, a cheaper alternative is HTTPMail Provider (**www.pocketgear.com**), which also operates as a plug-in to Inbox.

For displaying full HTML email in its native format, WebIS Mail (**www.webis.net**) is a solid choice, and also works with OneMail to download email from Web-based accounts. At present it only supports Pocket PC 2002 devices, but a Windows Mobile 2003 release is imminent. A freeware option for viewing HTML email via Pocket Internet Explorer (for POP email accounts only) is nPOPw (**www.wibble-wobble.com**), compatible with Pocket PC 2002 and Windows Mobile 2003.

▶ ***Full HTML:*** *WebIS Mail displays HTML email in its native format.*

▶ ***Piece of pie:*** *nPOPw utilises Pocket Internet Explorer to display HTML emails.*

▶ ***Versatile connection:*** *VersaMail supports connection to a number of Web-based email accounts.*

▶ ***Attachments rule:*** *SnapperMail's Incoming Mail Rules helps minimise data traffic.*

SETTING UP ACCOUNTS

To set up email accounts on your PDA, you'll need to know some of your account details, including your username and password for your ISP. You'll also need to know the type of account it is (POP or IMAP), the incoming mail server details (the server where your email is stored) and the SMTP server for outgoing mail (typically your ISP's). Once you have these details, creating a new account is easy.

In VersaMail on the Palm, tap on Accounts > Account Setup > New. On the Pocket PC, open Inbox > Accounts > New Account. If you're connecting to a corporate email account that uses SSL, be sure to tick the box for an SSL connection.

The trickiest setting is usually the outgoing mail server. This typically needs to be the mail server of the ISP you currently use for your wireless Internet connection. If you're using your own Wi-Fi network, this shouldn't pose a problem as it's the same outgoing mail server that you'd be using on your desktop. If you're connecting with a Wi-Fi hotspot or over GPRS, finding an outgoing mail server that works is more of a challenge, as most mail servers only allow subscribers to use them for outgoing mail.

One solution is to subscribe to a service that enables you to use their mail server for outgoing mail. One such service is FastMail (**www.fastmail.fm**). For US$14.95 a year, you can use FastMail's SMTP server for sending outgoing mail (as well as other benefits like an email address and online storage space).

FORMING AN ATTACHMENT

For some, the ability to download, view and/or edit and send email attachments is a must-have. VersaMail supports displaying text, Word and HTML files in text format out-of-the-box. It can also use third-party apps to display other attachment types — Documents To Go 6 (**www.dataviz.com**) for Microsoft Word and Excel documents in their native format (which also allows for editing the document), and the built-in Photos application for JPEG photos. Any file can be sent as an attachment, although only 5MB of attachments can be sent or received per email message. For more robust attachment support, SnapperMail (**www.snappermail.com**) is recommended. Provided that you have an application capable of opening the

attachment, SnapperMail automatically transfers the attachment to that program when you try to open it.

The great thing about the Pocket PC operating system is that it uses the same file formats as on the desktop. This means that all attachments can be viewed on the Pocket PC provided an app that's capable of opening the file is installed. Pocket PCs include applications capable of opening text, Word, Excel and picture files. Any file can also be appended to an email as attachments.

SIZE MATTERS

When accessing email over a Wi-Fi hotspot or GPRS, minimising the kilobytes downloaded may be necessary to avoid exorbitant data bills. Fortunately, most email programs have features built-in to reduce the kilobyte count. VersaMail has the option in Preferences to turn off attachment downloads as well as the ability to grab the header of the email only (sender and subject), rather than the entire message. SnapperMail goes a step further and features Incoming Mail Rules, such as the number of messages to fetch and the amount of kilobytes in the email to download. Inbox on the Pocket PC has settings for only grabbing email for a certain number of days, grabbing message headers only and limiting kilobytes per email.

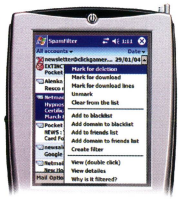
However, if you get a lot of spam even these settings aren't enough to minimise bandwidth. One solution is to use an email authentication service like Spam Arrest (**www.spamarrest.com**). This works by connecting to your mail server every two minutes and moving your new email to the Spam Arrest server. All your email is then processed — messages from verified senders are forwarded to your Spam Arrest inbox, unverified senders require authentication before joining the list of verified senders. This effectively prevents any spam from entering your inbox. Subscriptions start from US$19.95 for six months, but only POP email accounts are supported.

Alternatively, you can use an anti-spam application on the PDA itself. Unfortunately, such a solution doesn't yet exist for

▶ ***Limiting daily intake:*** *set your Inbox to only retrieve mail from the last three days.*

▶ ***Check for messages:*** *Inbox can automatically check for email at regular time periods.*

▶ ***Email auto-pilot:*** *VersaMail can download email during certain time periods and days of the week.*



▶ ***Nip it in the bud:*** *stop spam from infiltrating your inbox with Pocket SpamFilter.*

the Palm. On the Pocket PC, you can use Pocket SpamFilter (**www.pocketpcsoft.com**). This program deletes emails from the mail server without downloading them, minimising data traffic with user-configurable filters based on a number of attributes such as sender, subject, header and message body. Pre-defined filters and blacklisted domains are also included. As with Spam Arrest, however, only POP email accounts are supported. If you're on a budget, you can use the freeware nPOPw for viewing a list of email on your POP3 mail server. From this list (which displays the header only), you can select the email you want to download onto your Pocket PC.

THE BIG SETUP

There are a number of other settings you can configure in most email clients to make handling email easier. You can set the program to automatically download email every few minutes. In VersaMail, tap on Auto Get Mail, check the Get mail automatically box and specify the regularity of email download. A handy feature of VersaMail is that you can set it to automatically download email only within a certain time period in the day, and also only on particular days. This can be set up for each account, so that it automatically checks work email during work hours and personal email at all other times. In Inbox, go to Accounts > Accounts and select the email account you wish to configure. Tap on the account name in the box and click Next until you get to the Server information screen. Click on Options and tick the Connect and check for messages every. . . box.

By default, most handheld mail clients only make a copy of new email, leaving the original on the mail server. Leaving this setting as is means that if you download email from the same account on your desktop PC, you'll download the same emails you received on your PDA. In VersaMail, you can set it up to delete messages off the server upon download to your PDA by going to Options > Preferences and checking the Delete Msgs on Server box.

Inbox doesn't have an option to delete messages off the server — all email downloaded from a POP account are copies only. When connecting to an IMAP account, though, email deleted on the PDA is also deleted on the server upon the next connection, as well as any other changes made (such as organising mail into folders and replying to messages), though this doesn't always work reliably, particularly when using a non-Exchange mail server.

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SOFTWARE

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***David Williams* shows how to get up-and-running fast with Omnis Studio 3.2.1, a powerful and intuitive Web-based Rapid Application Development tool.**

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GETTING UP AND RUNNING

Installing Omnis Studio is a snap; just run the setup.exe file and follow the prompts. Select New User to have the installer make all the choices or Experienced User to access more detailed settings. Either way, all the default options are fine unless you have very specific needs. On Linux and Solaris in particular, be aware that the installer needs write access to whichever directory it's installed in — typically it needs to be installed as root if it's to be available system-wide.

Start Omnis Studio once installed. Immediately, the IDE is presented with several open windows. The main browser window displays all available libraries, lets new libraries be created and existing libraries be modified. Libraries are the fundamental building blocks of Omnis Studio applications.

The Component Store is a palette of icons containing all the objects and components available to build applications. Readers familiar with environments such as Visual Basic and Delphi will grasp this immediately. This palette includes menus, toolbars, reports, templates, wizards and other items which all combine to build a program. There are two rows to the Component Store: the top lists broad categories (Windows Classes, Net Classes, and so on). The bottom lists individual components within that category (different types of menus and a menu wizard, for example).

The Property Manager allows the individual behaviours and properties of any individual component to be altered, once it has been dropped onto a form. Again, this is familiar to users of other modern development environments.

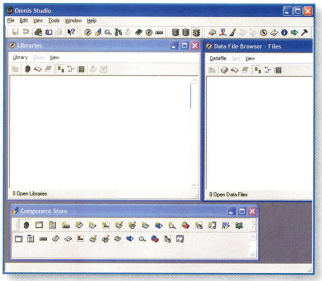
The Method Editor is where variables are created and actual program code is written. The program code links together all the components and responds to user interactions.

The Data File Browser manages data in Omnis' specific data formats. The SQL Browser accesses and maintains connections to external databases like Oracle and SQL Server.

All these windows — and others — combine to produce an Omnis Studio application.

BUILDING A FIRST APPLICATION

To create a first library, go to Tools > New Users. This displays



▶ ***How IDE do it:*** *there's plenty of information and control at hand via the Browser, Component Store and other windows.*

Omnis Studio's starter screen. From here, simple help, sample applications and starter wizards can all be accessed. The App Builder provides a straightforward step-by-step way of developing an initial library.

Alternatively, an application can be built from scratch. To do this, start by creating a new library. In the browser window, click on Library > New menu. Create a new library called Pics.lbs and an icon with this name appears in the browser.

Double-click on the icon and a second browser window opens, displaying all the elements within the library. To start with, there is just one element called Startup_Task — a special action which executes specific code when the library is opened.

To store data in Omnis Studio, you need to use a file class. Click on the File Classes category on the Component Store and then drag the New File icon onto the Browser. This inserts a new data file into the library. Rename this "fPics".

Double-click on fPics to open the data file editor in another Browser window. This is where the names and types of all data items to be stored in this file are configured. A useful application may be an image manager, perhaps for an artist to display their portfolio, or for end-users to store favourite clip-art.

Enter fields with these characteristics. Use the Modify > Next Field menu (or press Ctrl+N) to add each field.

Field Name, Category;Field Type, Character; Max length, 50; Description, indexed
Field Name, Name; Field Type, Character; Max length, 100; Description, indexed
Field Name, Picture; Field Type, Picture; Description, not indexed
Field Name, Desc; Field Type, Character; Max length, 1000;

Description, not indexed
Field Name, PicID; Field Type, Sequence; Description, indexed automatically

These fields mean the data file will store five elements of information about every picture: a category it belongs to, an individual name, the picture itself, a detailed description, and an auto-incrementing ID number. The ID number ensures every record has a unique identifier.

Of course, an application that can store data but has no way of entering or viewing it is next to useless. Close the data file window, and click back on the Component Store. Click the Windows Classes icon (second from the left), and then drag the Omnis Form Wizard from the Component Store and drop it onto the Pics library. Name this form "wPics".

Double-click on wPics and instantly the Form Wizard comes up, guiding the creation and design of the form. Select One field per file field at the first prompt, then Next.

The Wizard will now prompt for the file class and fields to be used in this form — fPics is listed (any other data files, if they exist, will display here too). Expand the + icon next to it, and the fields within fPics are listed. Check the box next to fPics to include all the fields in this form. Click Next.

Finally, the Wizard displays a variety of aesthetic themes for the window. Choose a suitable one and click Next > Finish. Omnis Studio builds the code to create the form that matches the specifications given. The form opens automatically in design mode, with the Properties Manager displayed to the right of the screen.

A real application has now been built. Omnis Studio automatically provides all the code to glue together the data file and the form. However, before it can be executed, the actual underlying store for the data file must be created. Click View > Data Browser to display the Data Browser. Select DataFile > New to create a new data file called "pics.df1" on disk. This data file can be populated with pictures, names, categories and descriptions.

Fortunately, Raining Data provides a sample data file already. In Windows, this can be found in the C:\Program Files\Raining Data \os321\Welcome\Tutorial directory. Use the Data Browser's DataFile > Open menu to open the pics.df1 data file in that directory.

Whether opened from disk or freshly created, the data file is displayed in the Data Browser window. Click it once to highlight it, then click the DataFile > Make Current menu option. An arrow appears next to the icon to show it's in use.

Many different data files — all with the same structure — can be created, opened and used with this library, without fear of overwriting anything. Just use the Make Current menu to change the active data file at any time.

To test out the library as it stands, click back on the wPics window. Then, press Ctrl+T to "test" the window. All the design-time labels disappear from the window, indicating that it's now in a runtime state and ready to receive real data.

If the provided data file from disk is used, there's real data to see: click Next to move to the first record. Immediately, a picture is displayed along with name, category and description. Click Next to move through the pictures in the data file.

Runtime and design-time modes can be toggled between by pressing Ctrl+T. In design mode, fields can be moved about and their properties changed. Pressing Ctrl+T resumes the runtime mode, and the changes are immediately visible. This is a tremendously powerful and beneficial feature which isn't available in many other development environments.

Use the Delete button to remove a record, and Insert to create a new record. Add the picture by tabbing to the picture field and clicking the Edit/Paste From File menu. Browse to any image file and click OK. That image will then displayed in the picture field on the form.

Now it's time to "Web-ify" the app. Close the wPics form, and save the library and data file. Click the Remote Form Classes category on the Component Store and drag a File Form class into the library. Name it "rfPics". Again, a wizard is invoked.

The wizard starts by asking whether to use an existing remote task or to create one. The remote forms are used to handle connections between Web browsers and server applications. Elect to create a new remote task and select Plain Remote Task from the dropdown menu. Name the task "rtPics" and click Next. Again, the wizard prompts for the data file to use. Check the box next to fPics again, but this time to prevent the PicID field being visible, expand the + and then uncheck the box next to PicID. Click Next.

The wizard then asks which field is the primary key, or unique identifier. Select PicID and click Next.

The next step asks whether code should be produced for Internet Explorer, other Web browsers (including Netscape) or both. Make a selection and click Create.

The library now contains a new element called rfPics; double-click on it and a form will be displayed which looks much the same as the data entry window created earlier. Use Ctrl+T to test the form within a Web browser. To make changes, close the Web browser and edit the form, then press Ctrl+T again to re-open a Web browser. A full-blown Web app with a database back-end has now been created.

Actually deploying the Web app is more involved, but essentially requires copying the Omnis Studio runtime environment onto a Web server, whether Windows- or Linux-based. There are details for this within the online help, but anyone who's configured a Web server shouldn't find this difficult.

What's new in version 4

A new, enhanced version of Omnis Studio is available with greater support for enterprise data. It connects to SAP systems, and includes a flexible report-writer. It has full support for JavaBeans, allowing Java developers to plug their own components into an Omnis Studio form.

Bonus CD software
Apache 2.0.48

Picture police

***Jarrod Spiga* shows how to configure the Apache Web server to prevent others from stealing images and blowing out your bandwidth allocation.**

Imagine the following scenario: you post an image on your Web site which proves popular with many of the visitors to your site. Someone who runs another site decides to display it, but rather than copying the image and storing it on their own server, they refer directly to your image.

While going against Web design etiquette, this type of "bandwidth stealing" occurs frequently. Why spend the time copying an image to your server, taking up disk space and bandwidth in the process, when you can just leech the resources from some other user? Sounds harmless enough — unless you're the victim. If unchecked, this type of unauthorised linking can see a blowout in your site's data transfer.

The good news is that if you're running the Apache Web server, you can add a few directives to your configuration files to prevent this from happening. This trick not only works for images, it can be customised to work for any file or file type.

SITE-WIDE FILTERING

Adding the following lines to your httpd.conf file will do the basic job for images (please note that Apache's developers have spelt the word referrer incorrectly):

```
RewriteEngine On
RewriteCond %{HTTP_REFERER} !=""
RewriteCond %{HTTP_REFERER} !^http://domain.name.com/.*$ [NC]
RewriteCond %{REQUEST_URI} \.(jpg|gif|png)$"
RewriteRule .* — [F]
```

The first line enables Apache's rewrite engine. Rewrites are a powerful tool which allow you to take strings from sections of a Web client's requests, and process those strings before being passed on to the Web server itself.

Some Web browsers and firewalls can be configured so that referrer information isn't sent to the Web server. This is done for privacy reasons, as it stops a Web server from seeing where a client has been. The second line lets all requests with a blank referrer through.

In the event that your images are being linked on another site and a client visits that site and blocks their referrer, they'll still be able to see the image. Considering that without this line, the same client visiting your site won't see the image, it's generally a good idea to keep this line in. It's not essential, however, so you can remove it if necessary.

Line three is responsible for determining whether the request has come from your site or not. The [NC] directive at the end of the line tells the rewrite engine that the string being checked is not case sensitive. By now, we know where the request has come from.

The next check is to see if an image has been requested. It would be rather silly to block all requests, since in most cases you'll want other sites to link to your pages for appropriate reasons. Our example checks for JPEG, GIF and PNG files, but you can customise this so that any file or file type is blocked.

The last line simply causes the Apache Web server to return a HTTP Status code of 403 to the client — Forbidden. Some sites prefer taking a more shame-inducing method of preventing their images from being stolen by using this RewriteRule command to forward an image including a message saying something like "The site you are viewing is stealing images from domain.name.com". Actually, these messages are generally not as nice and are often quite rude, but you get the idea. To do this, replace the last line with:

```
RewriteRule .* /images/stolen_image.jpg [L]
```

DIRECT CONTROL

This works well if you want to restrict image stealing over the whole server, but what if you only want to filter requests in certain directories on your server? The following lines could be added to a .htaccess file, or in an appropriate <Directory> container in the httpd.conf file, to do the same thing for specific directories:

```
<FilesMatch "\.(jpg|gif|png)$">
        SetEnvIfNoCase Referer "^http://([^/]*\.)?domain.name.com/"
local_referer=1
        Order Allow,Deny
        Allow from env=local_referer
</FilesMatch>
```

This has a similar result to the previous set of commands, but in a different order. Instead of checking every request going to the server, the server will only process rules if a JPEG, GIF or PNG file is loaded from the specified directory. If one of these image types is requested, the referrer field in the header is checked. If the local server name is present, the image is loaded from the server. Otherwise, a Forbidden status message (code 403) is presented. It's important to note that when using this method, blank referrers are still given 403 error codes.

Much like with the server-wide variant, you can designate a certain image to be loaded should a request be referred from another server. To do so, replace the third and fourth lines of the above code with:

```
        RewriteRule %ENV|local_referer| !1 /images/stolen_image.jpg
[L]
```

By adding these directives to your existing Apache configuration, you can have better control over how images (and other files) are loaded from your server, allowing you to better control your bandwidth and server resource usage.

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- Auto-selects the least crowded channel by Dynamic Channel Selection Function
- Quick and easy setup with Web-based management configuration utility

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- 1-port 10/100 Mbps WAN port

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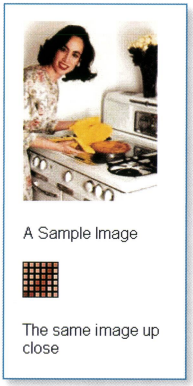
Keeping your privates private

Many people have concerns over the security of electronic communication. *David Emberton* illustrates how to keep prying eyes away.

Living in 2004, you might wonder whether you're even allowed to have a private life, such is the level of logging, caching and general nosiness. Especially over the Internet. Sure, you can use PGP and other means to send encrypted messages, but why should you have to look like a sneak to protect your missives? It's far better (and more fun) to maintain your privacy using techniques that nobody will notice, and a great way to do this is steganography.

In the commercial music and photography scenes, steganography is often referred to as "watermarking". Copyright holders embed tell-tale signatures inside music files and images, in the hope of picking up any infringing uses, and tracking overall usage. The better watermarks stay intact even after compression, allowing for the photo or song to be picked up through search engines on the Web or peer sharing networks.

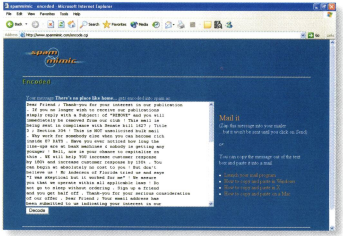
The main goal of watermarking, and steganography in general, is to embed your extra data in such a way that the original data isn't destroyed. The same applies when using the technology for sending private messages. There's no point putting a text message into an image file, for instance, if the image just ends up a scrambled mess. The idea is to be inconspicuous after all.



***A closer look**: text can be stored inside GIF images by tweaking pixels.*

Steganographers achieve this imperceptible embedding by figuring out which data in the host file matters the least. In binary files, this is the rightmost digit in each byte. In text files, it's usually control characters or whitespace — anything that's not going to seem altered at first glance. By padding, fiddling or otherwise transforming the data which least defines the original "image", the hidden file can be stored like the interference pattern on a hologram. An average GIF can hold about one quarter of its file size in stego'd text, since each pixel provides one bit of storage.

Part of the attraction of these techniques is that they allow things to be hidden in plain sight — but be careful, as obscurity doesn't equal security. Depending on how serious you are, you might use coded language or added encryption to the mix, but password protection is at least a minimum measure of safety. Without a password, all it would take to crack your message is the right decoding tool and a hunch.



***Spam it up:** cleverly hide secret messages in a spam email.*

Stego tools come in a variety of different flavours, including coding/translation, text embedding and image embedding. These different types can be used separately or combined for greater security. Free and cross-platform tools are the focus of this Workshop, but there are plenty of commercial and OS-specific ones as well. A good listing is available from **www.stegoarchive.com**.

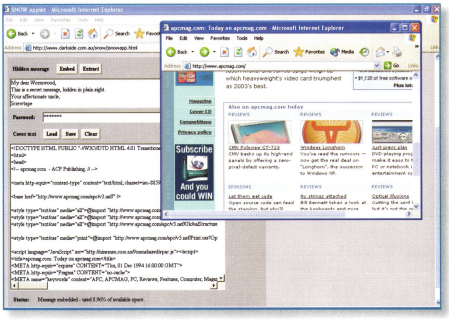
A GOOD KIND OF SPAM

Spammimic (**www.spammimic.com**) is a Web-based application that turns short text messages into spam. Since most junk mail looks the same, it's difficult to tell one sales pitch from another — hence the cleverness of Spammimic. By using stock phrases and paragraphs from real spam, the software takes the text you enter and builds an email with it. Like an Enigma machine for herbal Viagra.

The people behind the service warn that messages have to stay short, otherwise the fake spam starts to repeat suspiciously, so this technique won't always be appropriate. When it is though, simply enter your text in the Web form (with or without password), and then paste the result into an email message. When it reaches the recipient, they paste the encoded text into a similar form and it gets translated back into the original message.

This technique is especially useful if you happen to have a Hotmail or similar Webmail account. That way your messages are less likely to get filtered out prior to arrival, and your ISP is less likely to get blacklisted. If you want to use your regular email client, it's a good idea to agree beforehand with your buddies about filter-friendly characteristics — such as pre-determined subject lines — to ensure junk mail filters don't attack your correspondence.

▶ ***Web of lies:*** *even an innocuous Web page can have secret meaning.*



SNOWED UNDER

SNOW (**www.darkside.com.au/snow**) is an Australian Java program used to hide messages in text files. Unlike Spammimic, SNOW (Steganographic Nature Of Whitespace) relies on dummy text that you provide rather than generating its own. The program works by placing whitespace characters like tabs and spaces throughout the supplied file in such a way that it's invisible to anyone looking.

Because HTML, JavaScript and other Web standard languages are whitespace neutral, Snow makes a perfect tool for hiding messages inside Web pages. A browser will just skip over additional tabs and spaces and render the page as normal. But if you send the URL of the page to a clued-in friend, they can run the source through SNOW and obtain your message.

SNOW is a command line tool, so it'll work on any computer with a basic JVM. The author provides a manual page on his Web site (**www.darkside.com.au/snow/manual.html**), but the basic procedure is to call the SNOW program and supply the relevant details such as the source file, destination file, message and password. A simplified version of the program is also provided in embedded applet form, so you can encode files without leaving your browser.

EZSTEGO

EzStego (**www.stego.com**) is another Java program, designed to store text inside GIF images. The advantage of this technique is that: a) GIF images are everywhere; and b) sending funny or interesting pictures to people is so common that no-one will suspect what you're up to. Aside from emailing or posting your encrypted message on a Web page, you can also broadcast them as IM buddy icons. Anytime you want to say something without the possibility of it being noticed, just change your icon and your fellow chat user can decipher it.

The codec program itself works by taking the colour table of a GIF image — the legend of colours used in the picture — and organising it so all the similar colours are close together. It then scans through each pixel and tweaks the colour value up or down in order to store a bit from your input text. The result is an image that looks identical to the original, since all the colour changes are subtle. But if you take the end 0 or 1 from each pixel value and string them together you can recover the embedded text. Not that you actually have to do that by hand — the program will "unsteg" images for you, and will even fetch them from the Web if you have a URL.

EzStego is distributed as Java source code under the GPL license, so you'll have to compile it yourself. If you don't have a copy of the JDK or other Java compiler on your machine, don't stress. Just use an online compiler like JXXX (**www.innovation.ch/java/java_compile.html**). The resulting applet worked perfectly first time on Mac OS X. Windows users may need to acquire the appropriate software to run Java programs standalone, as EzStego appears not to like being run from a browser window. If you don't have a Java virtual machine, you can download one from **www.java.com**.

All that remains is to get your tools together and ensure your cohorts know what to look for. Otherwise, you might just have to rely on good old Australia Post. ETC

Thicker than water

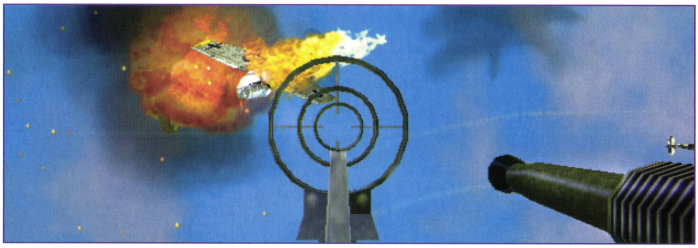
Information hiding in the form of watermarking has been with us for quite some time. Most obviously, this appears as patterns and hidden features in banknotes. Because the exact design of the security features is secret, and since they're seamlessly integrated into the currency, it's much easier to keep a lid on unsanctioned counterfeiting.

This technology recently came to prominence with the revelation that Adobe Photoshop and Jasc Paint Shop Pro were both being shipped with a hidden module that recognises "real" money and prevents it from being reproduced digitally. The routines, paid for by a group of international banks, run in the background until the right kind of image is detected. It's so successful that artists and designers need to acquire special insecure notes if they wish to use US or British currency in an image.

The application of information hiding was slightly less effective in the music industry. The Secure Digital Music Initiative (SDMI) set out to create a watermarking system that would brand music content at the studio so it would be recognisable even after compression into MP3 and other formats.

However, audio is more susceptible to corruption than other forms of data. A strong or "thick" watermark with plenty of redundant data would be hard to remove, but would also likely distort the sound.

In the end, the project came to a dramatic halt when a group of researchers very easily defeated all four techniques proposed by the SDMI consortium.



PC/XBOX/PS2

Secret Weapons Over Normandy

LucasArts, maker of the legendary X-Wing games, takes to the World War II skies but leaves its best storytellers behind. *Justin Kranzl* reports.

The flight sim market is like a microcosm of the consumer PC industry in general. On one hand, there are the experienced veterans, valuing complexity over simplicity; demanding as much control as possible. On the other you have the mainstream, willing to sacrifice micromanagement in return for ease of use.

Secret Weapons Over Normandy falls into the latter camp. Set in World War II, it owes more to classic titles such as Wings and Aces Over Europe than high-maintenance modern simulations. As compensation for not having to know your drag coefficient from an Immelman, players usually get a detailed plotline to follow, rather than just a terse sequence of missions.

Not so here, sadly. You're Chase, part of an elite squad of pilots charged with giving the Third Reich some righteous stick. While not tongue-in-cheek, the story does have the odd plot hole that stretches credibility. Missions are chained together by your letters home, which is the kind of low-finesse approach you might expect from a modern sim rather than a plot-crucial flying adventure game.

But while the storyline falls into the "could do better" category, the presentation of SWON is top-notch. Thankfully, console-resolution visuals aren't foisted on PC owners who have the hardware to produce superior graphics. Landscapes look the part, and the planes are authentic, substantial-looking beasts rather than the fragile-looking models which superseded them. There's also a real weighty quality to the craft in flight. It's easy to imagine that you're hurtling through the air in tonnes of steel as opposed to merely watching polygons move across a screen. A very flexible range of control options exist, so sim fans can use their expensive hardware to better effect than those toting a lowly gamepad. The generous physics model won't thrill hardcore players.

Quality audio goes a long way to preserve the illusion. Effort has been lavished on making the sounds of battle as authentic as possible, while the musical backdrop has a real barnstorming feel. The voice acting is laden with bombast and enthusiasm, conveying romantic perceptions of the era rather than gritty realism.

The game's story progresses through a series of 30 missions — both air-to-air as well as taking out ground and naval targets. The locations cover the breadth of the conflict: the skies of Britain, France, Eastern Europe, North Africa and the Pacific all are there for the taking. There are 20 aircraft to master, most of which can be upgraded with a variety of weapons. While many craft will be flown on one sortie and quickly forgotten, there is a tight clique of fighters — including experimental planes — whose characteristics will endear themselves as favourites. Those wishing an extra challenge can always handicap themselves by taking to the air in inferior machinery and trying their hand against a more "modern" enemy.

▶ ***View to a kill:*** *graphics are superbly authentic.*

SWON's chief failing is in its storyline, an area this type of game is expected to excel in. Given the storytelling pedigree of SWON's makers, LucasArts, more time should have been spent here, especially considering multiplayer isn't supported on PC. Console players get a split screen mode. Better than nothing — but only just.

It's asking a lot to expect PC gamers to overlook these twin failings, but those who do will be rewarded by a lengthy challenge with plenty of diversity. Secret Weapons Over Normandy is not the shot in the arm the genre desperately needs, but its superb visuals, audio and length mean it's a quality gaming experience.

Details

Contact	Electronic Arts
Online	www.lucasarts.com/products/normandy
Price	$89.95
Verdict	●●●◐○

PC/PS2

EA Cricket 2004

As another cricket season fades into memory, cricket-mad gamers are left wanting more. But is EA's effort better left to go through to the 'keeper?

Cricket titles have never really scaled the heights of more universally played sports in video game format, but that doesn't mean there's not a market for them.

The Electronic Arts approach of licensing big names and locations ensures first impressions are good. Richie Benaud lends his golden tonsils to the (somewhat stilted) match commentary, and playing rosters for each country and county/state team are correct. Sponsors and grounds are also a reasonable facsimile of reality.

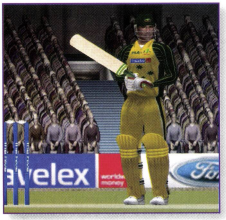
The graphics are a disappointment and, like Rugby 2004, appear a couple of generations behind other EA titles. The player models bear only scant resemblance to their real life counterparts — if you don't know Brett Lee from Sourav Ganguly, don't expect this game to provide much more illumination beyond skin tone.

Despite an overhaul from the previous Cricket 2002 title, the Renderware-powered graphics engine shows its age, and in motion appears jerky and unconvincing, no matter what the resolution.

Play can be a trying experience. Hitting a six is an all-too-frequent exercise. The ease with which it's accomplished robs the game of what should be a genuine highlight. There isn't enough variation in the length and power of the strokes a batsman makes, or enough control over the shot's direction.

Short pitched bowling — a standard feature of the game — is given poor treatment. Sending the ball whistling past the helmet of the batsman usually results in the keeper missing it also, no matter which keeper you choose. Cost? Four runs and an admonition from the commentators about wide bowling.

The physics modelling is a throwback to the old school of sports game development, where real time physics is nowhere to be found. A passage of play goes as follows: select a delivery type, do your best to pinpoint the spot where you want the ball to pitch (bounce), then a speed meter slowly rises as your bowler approaches the crease. Adjust spin and swing on the ball, then press the relevant button as the bowler hits the crease. The bowling animation is executed and the delivery made. The batsman then selects an attacking or defensive stance and their shot type.



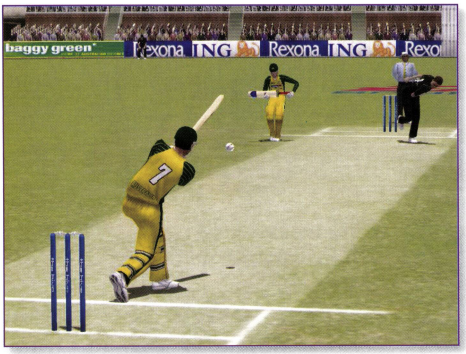
▶ ***Disappointing graphics:*** *the crowd went mild.*

Given that the targeting spot for the bowler lets the batsman know where the ball is going to land, this isn't the most complex process. The ball's motion should have been modelled independently of the bat's. It would have entailed more work initially, but yielded a much more diverse array of strokes and ball paths.

Fielding is handled equally poorly. When the automatic fielding option is used, players chase rather than intercept the ball. Animation is also shoddy — as the fielder nears the ball, it magically hops the last few inches into their waiting palms. Catches are rarely regulation "sitters", but rather full-length diving efforts worthy of any classic catch competition — if they didn't all look identical.

The list of complaints doesn't detract from the basic fun of Cricket 2004. It's fine for a casual slog, even though multiplayer mode is as frustratingly arbitrary as single player. It won't induce players to play through season after season, however — it simply isn't sophisticated enough to justify the attention.

Cricket 2004 is easily the best cricket game available, but that isn't saying much. EA is trading on a lack of competition and the game's licenses to paper over some big cracks in gameplay. If you must play cricket on your PC, this is acceptable, otherwise retire your wallet, and spare it the hurt.



▶ ***What sponsors?*** *At least these guys know what team they're batting for.*

Details

Contact	Electronic Arts
Online	www.easportscricket.com
Price	$69.95
Verdict	●●◐○○

Black Hawk Down: Team Sabre

PC

When video game makers go hunting for an evil empire, Colombia wins hands down, even over Iraq. So it's no surprise that the makers of the rather lacklustre Black Hawk Down selected Colombia as a scenario for their new mission pack, as well as Iran, just to add a bit of fundamentalist flavour.

Team Sabre offers more weapons, more maps, and sadly more mediocrity. Crucial shortcomings of the parent title, such as indifferent enemy and team AI, have only been faintly addressed. It's still possible to mow down enemy squads at a distance. Swivelling around aimlessly while under fire — instead of taking cover — isn't likely to appear in any Delta Force tactical handbooks.

The dated graphics don't help matters. The environments are acceptable, if not as detailed as the likes of Soldier of Fortune II. The player models assume a fair level of authenticity when up close and personal. However, at medium to long range they're blobby, indistinct figures. The poor effects and shambling animation on display will tempt you to shoot friend and foe on sight, if only to put your graphics card out of its misery.

Audio is perhaps the saving grace of the game. Encoded in Dolby Digital, the radio crackles to life with an air of crisp authority, and weapon effects are meaty and satisfying. But game development has proceeded a long way now, and this kind of standard is rapidly becoming the norm in a market touting Hollywood voice acting and licensed soundtracks.

The large variety of maps and scenarios make multiplayer mode more fun than single player, even if two extra campaigns have been added. Offering 50 players on LAN is quite an achievement, but with alternatives like the freely downloadable Battlefield 1942 modification, Desert Combat (**www.desertcombat.com**), paying for a lesser experience is a hard task. This looks and plays like a game one generation too old, and will only appeal to the tight clique of Delta Force: Black Hawk Down fans.

▶ ***Hold your fire:*** *Team Sabre is missing that spark.*

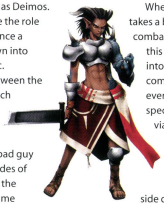
Details

Contact	Electronic Arts
Online	www.novalogic.com
Price	$49.95
Verdict	●●○○○

Arc: Twilight of the Spirits

PS2

Sony's Arc the Lad series demonstrates you don't need to have a keyboard full of complicated commands and shortcuts to make a compelling RPG. A state of tension exists between the game world's human and non-human inhabitants, known as Deimos. With conflict imminent, you take the role of Kharg, a human, then experience a perspective shift as you're thrown into playing his Deimos brother, Darc.



The way the story moves between the two is reminiscent of the approach taken by Beyond Good and Evil (reviewed *APC* March, page 138). Players are compelled to move away from the good guy/bad guy approach and look at multiple sides of every story. Certainly Twilight of the Spirits works equally well as a game for teens as well as the mature adult audience that Sony contends makes up the majority of its market.

The quality of the visuals belies the graphical limitations of the PS2. Even on a television, the character models are full of life and detail, and the quality of the animation is on a par with the best offerings on PC. Audio is equally well implemented, with a dramatic score underpinning a solid voice acting effort.

When it comes time to fight, magic takes a back seat to tactical turn-based combat. Unusually for a game of this style, players can manoeuvre into advantageous positions in combat, as opposed to taking every challenge front on. Spells and special effects are carefully rationed via the use of a collectable currency that has to be "spent" in order to use.

The length of the game is diminished by the scarcity of side quests, but players will still need to devote serious time to completing it. The ability to build your character's powers means thorough players can really drain every last drop out of the game. That said, it's unlikely that players will return after completion.

▶ ***Magic time:*** *spectacular battles abound.*

Details

Contact	Sony Computer Entertainment
Online	http://au.playstation.com
Price	$99.95
Verdict	●●●●○

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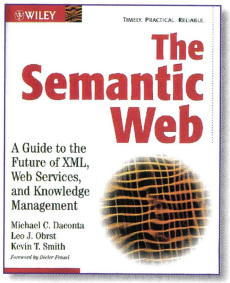
The Semantic Web:

A Guide to the Future of XML, Web Services, and Knowledge Management



Details	
Publisher	Wiley
Price	$65.95
ISBN	0471432571

At its most basic, the idea of the Semantic Web is part of Tim Berners-Lee's original vision of the Web, namely that presently unstructured Web pages could eventually be machine processed and "understood" by intelligent applications. As a simple example, consider a search engine which understands search terms and finds genuinely matched Web pages based on their content and meaning.

The Semantic Web builds on this idea, offering the intriguing idea that computers can be trained to make decisions for faster Business to Business (B2B) trading implementations, effective customer management and seamless data warehousing.

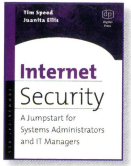
The authors conceive a framework for creating intelligent software applications which automate processes of reasoning and decision-making. This requires existing business information systems be enhanced to improve knowledge management, and then the development of a full-blown Semantic Web system using XML-based Web services and the emerging Web ontology language, OWL.

The Semantic Web isn't merely restricted to Web pages. The authors take care to illuminate the vast quantities of business intelligence amassed in typical Office files stored throughout a company's network. The authors contend that these, too, should be part of a knowledge management system which helps unify an organisation's intelligence.

This book provides an interesting vision of a subject of genuine academic interest. However, it fails to balance the vision with the technology. Much is made of taxonomies and ontologies (basically, a hierarchical structuring) but these aren't defined until chapters seven and eight. Even then, chapter eight abruptly ends with a description of OWL but with no examples whatsoever.

David Williams

Internet Security: A Jumpstart for Systems Administrators and IT Managers



Details	
Publisher	Digital Press
Price	$105.60
ISBN	1555582982

Internet Security offers comprehensive coverage of security issues that IT managers need to be aware of. The authors help formulate company-specific policies relating to acceptable computer usage, administration procedures, audit handling and intrusion-response procedures.

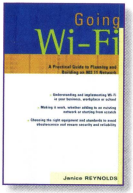
It doesn't focus on particular hacking techniques, specific tools or technologies. It's aimed at a managerial level and the "jumpstart" in the title is apt, given the book — by design — furnishes a detailed overview, never wading into the realm of genuine examples or a technical discussion.

A large concluding section lists computer security-related products and vendors, with contact information. But these are almost exclusively from the US and of limited value to Australian readers.

Internet Security is well-written, detailed and can genuinely assist the busy IT manager in protecting their company's assets and intellectual property. This title is very expensive, however, it's cheaper than hiring a security consultant to give the same or less guidance. Copies can be purchased from Elsevier Australia on 1800 263 951.

David Williams

Going Wi-Fi: A Practical Guide to Planning and Building an 802.11 Network



Details	
Publisher	CMP Books
Price	$59.95
ISBN	1578203015

The popularity of Wi-Fi is booming as it offers increasingly high-speed connectivity and decreasing costs. Businesses have discovered value in wireless networks, allowing staff to collaborate when and where they choose without being tethered to a wall socket.

This book offers thorough and thoughtful guidance in installing Wi-Fi, through the complex suite of 802.11 standards, as well as the real nuts and bolts of Wi-Fi hardware. Nothing is vendor-specific, giving it both a universal and precise approach.

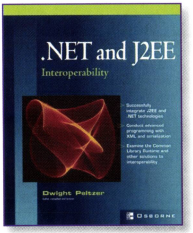
It ranges through the whole spectrum of enterprise networks, through to small business, educational institutions and those seeking public access hotspots.

Happily, there is complete coverage of security issues — a real must given the rise of wireless hacking, which requires no more sophistication than being able to operate a laptop with a wireless connection and parking outside a competitor's office.

The author also analyses where the technology is going and what the future will hold. Although largely an academic text, checklists and case studies keep the emphasis on real-world situations.

David Williams

.NET and J2EE Interoperability



.NET and J2EE Interoperability's back cover blurb states that both Microsoft and Sun have technically reviewed the book and that it's a one-of-a-kind resource giving solutions to cross-platform communications. It asserts that many technical issues arising from integrating .NET and J2EE are examined.

The premise is that .NET and J2EE are two of the leading technologies being used in large systems today, and neither is "merely" a programming language but a complex suite of tools offering many enterprise-grade facilities.

Rather than taking the biased view that one is necessarily better than the other, the author recognises that the real nuts-and-bolts IT worker needs to be up-to-speed on both platforms. Hence, this book takes a pragmatic approach and strives to explain how to make these two interoperate in a heterogeneous environment. However, this explanation never occurs. Instead, eight chapters go into detail about what .NET and J2EE are and aren't, and what they can do — separately. The last chapter even has some real "best-practice" suggestions. Yet, every single example has .NET talking to .NET, or Java talking to Java, except in the penultimate chapter, in which third-party offerings are briefly covered.

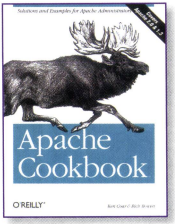
To the author's credit, he gives more than just surface coverage of each technology and a good programmer could possibly make use of the information given to work out how to interoperate the languages (for instance, working directly with XML structures). But this isn't a book about .NET and J2EE interoperability; perhaps a more appropriate title would be *".NET and J2EE: A guide to each"*.

David Williams

Details

Publisher	McGraw Hill/Osbourne
Price	$79.95
ISBN	0072230541

Apache Cookbook



Powerful and popular, configuring an Apache Web server to perform specific tasks is often difficult. The *Apache Cookbook* steps in with over one hundred recipes (short and complete pieces of code), designed to take real-world problems, show the solutions, and then discuss what's occurred.

It's suitable for server administrators and Webmasters, but readers won't take much away from it by reading cover to cover. Ideally, the book should be referred to when you have a specific problem or want to achieve a particular configuration.

Considering that almost anyone who works on a Web server will have access to the Internet, all of the solutions listed in the book could be found by scouring through various newsgroups, mailing lists, FAQs and forums. But having the answer in front of you saves trawling through the clutter of what's online — especially important if you're working on a live server and can't afford any impact on service.

The book is by no means complete. There are a number of problems within the book that have no known answer. And there will undoubtedly be the occasional problem that's not even mentioned. An errata page has been set up on the *Apache Cookbook* Web site (**http://apache-cookbook.com**), listing all changes (including changes in URLs printed in the book), errors and omissions.

The *Cookbook* covers both version 2.0 and 1.3 of the Web Server, and isn't specific to Unix operating systems either, as many of the solutions list the points that you need to consider under a Windows environment.

Jarrod Spiga

Details

Publisher	O'Reilly
Price	$65
ISBN	0596001916

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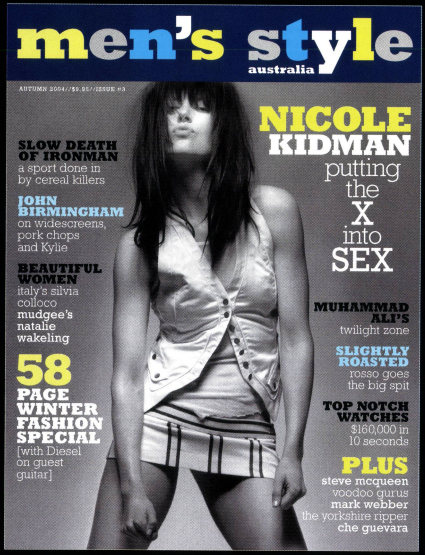

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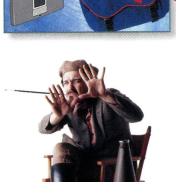
In the May issue of apc

Total mobility

Are the latest mobility tools helpful or just plain old hype? This year we'll be bombarded with the virtues of being able to work anywhere, anytime. *APC* checks out the newest smartphones on the market, along with Tablet PCs; PDAs; around 40 Centrino notebooks; and a range of laptop bags and accessories including batteries, adaptors and more.

Unwired

Other than the benefit of a cable-free workspace, is wireless really better? We round-up the latest 802.11g access points and show you the Lab results.



DVD editing

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Projection

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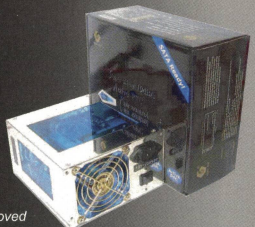

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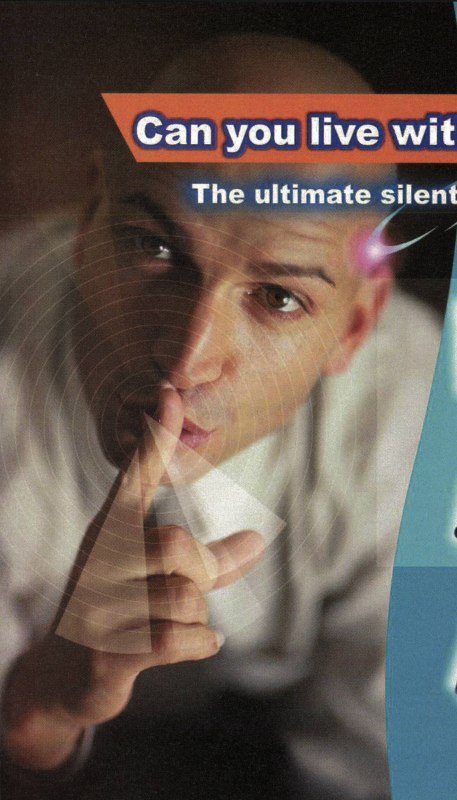

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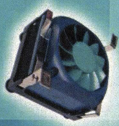

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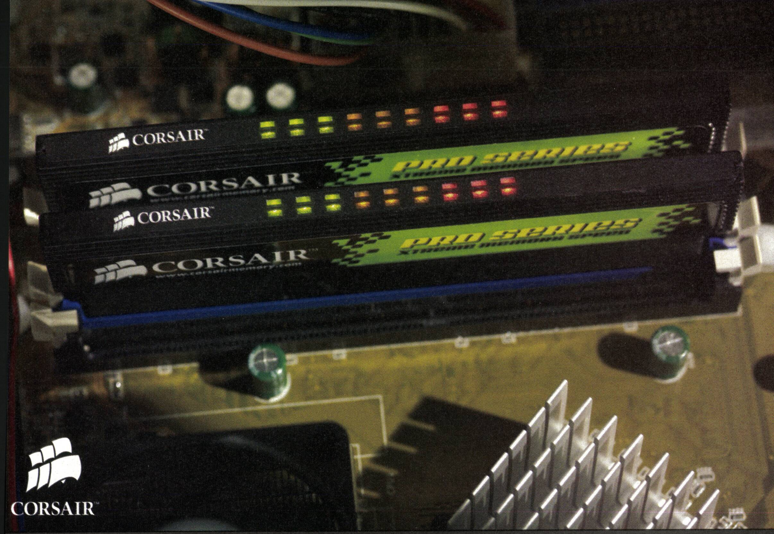

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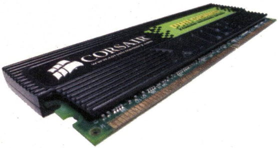

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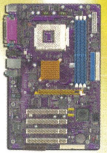

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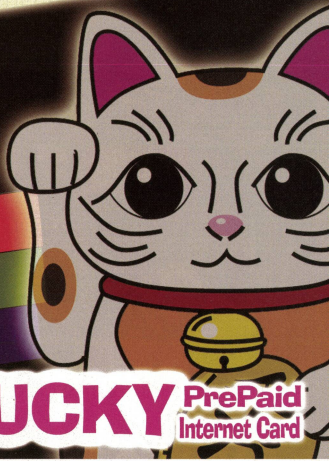

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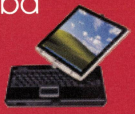

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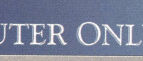

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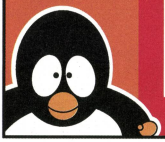

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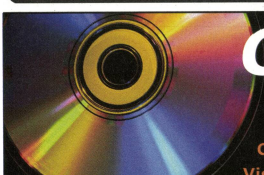

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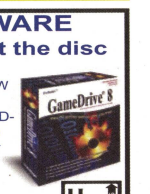

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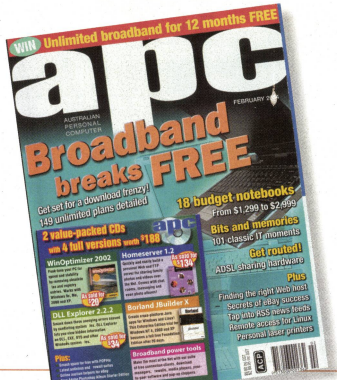

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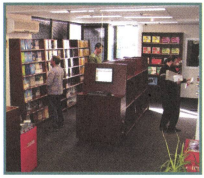

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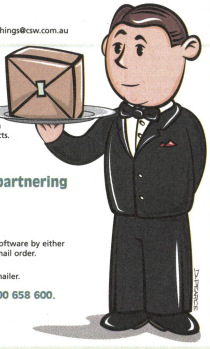

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Computer Products at Rock Bottom Prices

IBM Notebooks

Series: R40e
Processor: Celeron 2.2Ghz
Memory (RAM): 256MB
Video (RAM): ATI RADEON IGP 330M
Hard Drive : 30GB 4200RPM
Storage: DVD Rom
Display: 14.1" XGA
Modem/Lan: 56k (V.92) / 10/100
Pointing Device: TrackPoint
Operating System: MS Windows XP Professional
Weight: 2.7kg
Dimensions: 3.89cm x 31.3cm x 25.4cm
Warranty: 1 year

$1651
RENTSMART $18.10 PER WEEK*
Websearch Code 211696

Series: G40
Processor: Pentium P4 3Ghz
Memory (RAM): 256MB
Video (RAM): Intel Extreme Graphics
Hard Drive : 40GB 4200RPM
Storage: Combo Drive
Display: 15" XGA
Modem/Lan: 56k (V.92) / 10/100 / Wireless Lan
Pointing Device: TrackPoint
Operating System: MS Windows XP Professional
Weight: 4.02kg
Dimensions: 5.09cm x 32.9cm x 28.2cm
Warranty: 1 year

$2437
RENTSMART $23.90 PER WEEK*
Websearch Code 211158

Series: R50
Processor: Pentium M 1.5Ghz
Memory (RAM): 256MB
Video (RAM): ATI Mobility RADEON 7500
Hard Drive : 40GB 4200RPM
Storage: Combo Drive
Display: 15" XGA
Modem/Lan: 56k (V.92) / 10/100 / Wireless Lan
Pointing Device: ThinkPad UltraNav
Operating System: MS Windows XP Professional
Weight: 3.0kg
Dimensions: 4cm x 33.2cm x 26.9cm
Warranty: 1 year

$2555
RENTSMART $25.06 PER WEEK*
Websearch Code 211698

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Monitor not included.

Processor:	Intel Celeron 2.8GHz	Intel Pentium 4 2.8GHz	Intel Pentium 4 2.8GHz HT	Intel Pentium 4 3.0GHz HT	Intel Pentium 4 3.2GHz HT
Motherboard:	Gigabyte GA-8IG1000MK	Gigabyte GA-8IG1000MK	Gigabyte GA-8I875	Gigabyte GA-8I875	Gigabyte GA-8I875
Memory (RAM):	256MB 333Mhz	512MB 333Mhz	512MB 400Mhz	512MB 400Mhz	1GB 400Mhz
Hard Drive:	40GB 7200rpm ATA	80GB 7200rpm ATA	80GB 7200rpm ATA	120GB 7200rpm ATA	240GB Serial ATA
Storage:	52x32x52 CD-RW, Floppy	52x32x52 CD-RW, Floppy,DVD	Combo, Floppy	DVD Burner, Floppy	DVD Burner, Floppy
Graphics:	Integrated VGA	Intel Video Extreme	Gigabyte Radeon 9200 128Mg	Gigabyte Radeon 9200 128Mg	Gigabyte Radeon 9600 128Mg
Modem:	56K	56K	56K	56K	56K
Network:	Integ. 10/100 NIC	Intel Pro/100VE NIC	Integ. 10/100 NIC	Intel Pro/100VE NIC	Intel Pro/100VE NIC
Keyboard:	Microsoft Multimedia	Microsoft Multimedia	Microsoft Multimedia	Microsoft Multimedia	Microsoft Multimedia
Mouse:	Microsoft Wheel Optical	Microsoft Wheel Optical	Microsoft Wheel Optical	Microsoft Wheel Optical	Microsoft Optical
Speakers:	Altec Lansing AVS200	Altec Lansing AVS200	Altec Lansing AVS300	Altec Lansing AVS300	Altec Lansing AVS300
Operating System:	MS Windows XP Home	MS Windows XP Home	MS Windows XP Home	MS Windows XP Home	MS Windows XP Home
Warranty:	2 Yrs Return-to-Base	2 Yrs Return-to-Base	2 Yrs Return-to-Base	2 Yrs Return-to-Base	2 Yrs Return-to-Base
PRICE MAY DROP! Call or visit www.iswh.com.au for best price	$985 RENTSMART $10.80 PER WEEK* Websearch Code..... 213412	$1175 RENTSMART $12.88 PER WEEK* Websearch Code..... 213413	$1465 RENTSMART $16.06 PER WEEK* Websearch Code..... 213414	$1695 RENTSMART $18.58 PER WEEK* Websearch Code..... 213415	$2145 RENTSMART $23.51 PER WEEK* Websearch Code..... 213416

IBM Workstations

Purchase Office 2003 on your new computer - It's cheaper!

Monitor not included

Series:	A30	A30	A30	A50P	
Man#:	8191LMP	8191LMQ	8191LMR	81943AM	
Form Factor:	Desktop	Desktop	Desktop	Mini Tower	
Processor:	Celeron 2.4Ghz	Pentium P4 2.8Ghz	Pentium P4 2.8Ghz	Pentium P4 2.8Ghz	
Memory (RAM):	256MB	256MB	256MB	512MB	
Video:	Intel Extreme Graphics	Intel Extreme Graphics	Intel Extreme Graphics	Intel Extreme Graphics	
Hard Drive:	40GB 7200RPM	40GB 7200RPM	40GB 7200RPM	80GB 7200RPM	
Storage:	CD-Rom, Floppy	CD-Rom, Floppy	CDRW, Floppy	Combo	
Modem/Ethernet:	Integrated Intel PRO/100 Eth.	Integrated Intel PRO/100 Eth.	Integrated Intel PRO/100 Eth.	Integrated Intel PRO/100 Eth.	
Keyboard:	IBM Preferred Pro	IBM Preferred Pro	IBM Preferred Pro	IBM Preferred Pro	
Mouse:	IBM Wheel Mouse	IBM Wheel Mouse	IBM Wheel Mouse	IBM Wheel Mouse	
Operating System:	MS Windows XP Pro.	MS Windows XP Pro.	MS Windows XP Pro.	MS Windows XP Pro.	
Warranty:	1 Year	1 Year	1 Year	1 Year	
PRICE MAY DROP! Call or visit www.iswh.com.au for best price	$911 RENTSMART $9.99 PER WEEK* Websearch Code 214449	$1112 RENTSMART $12.19 PER WEEK* Websearch Code 214450	$1162 RENTSMART $12.74 PER WEEK* Websearch Code 214451	$1463 RENTSMART $16.04 PER WEEK* Websearch Code 214514	

Series: A30
Man#: 6826KMK
Form Factor: Small Form Factor
Processor: Pentium P4 2.66Ghz
Memory: 256MB
Video: Intel Extreme Graphics
Hard Drive: 40GB 7200RPM
Storage: CD-Rom, Floppy
Modem/Ethernet: Integrated Intel PRO/100 Ethernet
Keyboard: IBM Preferred Pro
Mouse: IBM Wheel Mouse
Operating System: MS Windows XP Professional
Warranty: 1 Year

$1112
RENTSMART $12.19 PER WEEK*
Websearch Code 210297

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HP Compaq Notebooks

Series:	NX5000	NX7010	NX9110
Man#:	DV614PA#ABG	**Bundle with H2210 Ipaq**	**Bundle with MS Office 2003 SBE**
Processor:	Pentium Mobile 1.4GHz	Pentium Mobile 1.6GHz	Pentium 4 3.06GHz
Memory:	256MB DDR	512MB	512MB
Hard Drive:	40GB	60GB	40GB
Storage:	DVD/CD-RW Combo	DVD/CD-RW Combo	DVD/CD-RW Combo
Display:	15" XGA TFT	15.4" colour TFT	15.4" colour WXGA
Modem / Lan:	56K (V.92) / 10/100	56K (V.92) / 10/100	56K (V.92) / 10/100
Wireless / Bluetooth:	802.11b	802.11b / Bluetooth	802.11b / Bluetooth
Pointing Device:	Touchpad	Touchpad	Touchpad
Operating System:	MS Windows XP Pro	MS Windows XP Pro	MS Windows XP Pro
Weight:	4.51kg	6.30kg	6.57kg
Warranty:	1 year parts & labour	1 year parts & labour	1 year parts & labour

PRICE MAY DROP! Call or visit www.iswh.com.au for best price

$2365	$3465	$2563
RENTSMART $23.20 PER WEEK>	RENTSMART $33.98 PER WEEK>	RENTSMART $25.14 PER WEEK>
Websearch Code 214262	Websearch Code 213804	Websearch Code 214255

Series:	NX9010		
Man#:	**Bundle with H2210 Ipaq**		
Processor:	Pentium 4 Mobile 3.06GHz		
Memory:	512MB		
Hard Drive:	40GB		
Storage:	DVD/CD-RW Combo		
Display:	15" SXGA+		
Modem / Lan:	56K (V.92) / 10/100		
Wireless:	No		
Pointing Device:	Touchpad		
Operating System:	MS Windows XP Pro		
Weight:	6.57kg		
Warranty:	1 year parts & labour		

PRICE MAY DROP! Call or visit www.iswh.com.au for best price

$2541 — RENTSMART $24.92 PER WEEK> — Websearch Code 213832

NX9010 Bundled with FREE H2210 Ipaq While stocks last!

NX9110 Bundled with MS Office 2003 SBE While stocks last!

NX7010 Bundled with FREE H2210 Ipaq While stocks last!

Toshiba Notebooks

Satellite P20 model displayed with 17" TFT Wide XGA.

- **Satellite Series**
  Ideal for small business, home office & personal users.
- **TE2300 Series**
  Exceptional performance with wireless connectivity.
- **Tecra series**
  High quality technology platform with wireless connectivity.
- **Portege series**
  Ultra portable wireless computing without compromise.

Easy to deploy and manage. Flexible, expandable and portable design!

Series:	Satellite A10	Satellite A10	TECRA M2	Satellite P20
Man#:	PSA10A-0Y75M	PSA10A-05HUM	PTM20A-002T2	PSP20A-07XC7
Processor:	Celeron 2.4GHz	Pentium P4-M 2.4GHz	Pentium P4-M 1.5GHz	Pentium P4-M 2.8GHz
Memory (RAM):	256MB	512MB	512MB	512MB
Video (RAM):	64MB	64MB	64MB	64MB
Hard Drive:	40GB	60GB	40GB	80GB
Storage:	Combo	DVD Burner	Combo	DVD Burner
Display:	14.1" LCD 1024x768	15" LCD 1024x768	14.1" TFT 1024x768	17" XGA TFT 1440 x 900
Modem/LAN:	Modem/ 10/100 Ethernet	Modem/ 10/100 Ethernet	Modem/ 10/100 Ethernet	Modem/ 10/100 Ethernet
Operating System:	MS Windows XP Pro	MS Windows XP Pro	MS Windows XP Pro	MS Windows XP Pro
Weight:	2.8kg	2.8kg		4.5kg
Dimensions (WxDxH):	332x293x33-40	332x293x33-40	314x259x32-35	419x293x41-47
Warranty:	1 Year parts & labour	1 Year parts & labour	1 Year parts & labour	1 Year parts & labour

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$1810	$2768	$2821	$4471
RENTSMART $19.84 PER WEEK>	RENTSMART $27.15 PER WEEK>	RENTSMART $27.67 PER WEEK>	RENTSMART $41.79 PER WEEK>
Websearch Code 211107	Websearch Code 211967	Websearch Code 211567	Websearch Code 211568

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Your first line of defence against slim notebook computer theft. The patented T-bar design engages the maximum surface area possible in the Kensington security slot. Cable Length-180cm

$85 — Websearch Code 193581

Kensington ComboSaver Security Cable

- Patented T-bar lock and strong cable secures and protects notebook computers from theft
- Attaches to industry-standard, Kensington security slot

$55 — Websearch Code 193213

Computer Products at Rock Bottom Prices

Palm Tungsten T Essentials Kit

Includes Scuba Sleeve case, Recharging USB HotSync cable, Styli (2), screen protectors (6) and screen cleaner.

$49

Webcsearch Code 204950

Belkin Universal Slim Leather Case

For Handhelds

Your Palm, Handspring or other handheld will attach securely in place with a simple Velcro system. Fine grain leather case includes compartments for essentials like business and credit cards, ID and even a spare stylus.

$45

Webcsearch Code 208744

Belkin USB PDA Adaptor

Provides one DB9 Serial Port and is the most convenient way to connect your handheld to your computer. Works with Palm and other popular handheld PDAs. Completely portable. Lifetime Warranty.

$59

Webcsearch Code 189585

Palm Handhelds

With a reputation for being easy to learn & use, Palm handhelds are the most popular in the world. **Also available** - Customise your handheld and add new functionality with accessories for your model. **Expansion Cards** - Add software, eBooks and even databases with memory-saving MultiMediaCard or SD expansion cards. **Peripherals** - Snap-on a keyboard, wireless modem or even a GPS receiver for "I-didn't-know-I-could-do-that" transformations. **Cases & Covers** - Express yourself with black leather, tough aluminium, or whatever suits you.

Palm Zire 71

Memory: 16MB
Screen: 320x320 Transflective Colour
Processor: TI (ARM) OMAP 310 144MHz
OS Version: Palm OS 5.2.1
Size: 114x74x17mm
Weight: 150g

Features: Personal Organiser, Word/Excel/Power Point Compatibility, MP3 & Video Playback, Stereo Headphone Jack, Built-in Digital Camera

Price $419
Websearch: 196602

Palm Tungsten T2

Memory: 32MB
Screen: 320x320 Transflective Colour
Processor: TI (ARM) OMAP 1510 144MHz
OS Version: Palm OS 5.2.1
Size: 102x77x15mm
Weight: 159g

Features: Personal Organiser, Word/Excel/Power Point Compatibility, MP3 & Video Playback, Stereo Headphone Jack, Voice Memo Recorder, Bluetooth

Price $500
Websearch: 208742

Palm Tungsten W

Memory: 16MB
Screen: 320x320 Transflective Colour
Processor: Motorola Dragonball 33MHz
OS Version: Palm OS 4.1.1
Size: 122x78x16.5mm
Weight: 185g

Features: Personal Organiser, Word/Excel/Power Point Compatibility, Stereo Headphone Jack, Voice Communications, Qwerty Keyboard, GSM/GPRS

Price $694
RentSmart: 7.61pw
Websearch: 209493

hp iPAQ H1930

Memory: 64MB
Screen: 240x320 Transflective Colour
Processor: Samsung (2410) 203MHz
OS Version: MS Win PocketPC 2003 Pro
Size: 113x70x13mm
Weight: 124g

Features: Voice Recorder, SD Slot (SD/SDIO/MMC), Speaker, Microphone, Stereo Jack, Audio Record/Playback

Price $379
Websearch: 209078

hp iPAQ H2210

Memory: 64MB
Screen: 240x320 Transflective Colour
Processor: 400MHz Intel XScale tech-based
OS Version: MS Win PocketPC 2003 Prem
Size: 115x15x76mm
Weight: 144g

Features: Handwriting Recognition, Soft Keyboard, Character Recognition, Voice Recorder, Inking, SD/IO Slots, Audio Record/Playback, Speaker, Headphone/Microphone Jack, Bluetooth

Price $646
RentSmart: $7.02pw
Websearch: 207331

hp iPAQ H5150

Memory: 64MB
Screen: 240x320 Transflective Colour
Processor: 400MHz Intel XScale tech-based
OS Version: MS Win PocketPC 2003 Prem
Size: 133x84x16mm
Weight: 187g

Features: Handwriting Recognition, Soft Keyboard, Character Recognition, Voice Recorder, Inking, SDIO/SD/MMC Slot, Speaker, Microphone, Stereo Headphone Jack, Audio Record/Playback, 32MB Flash ROM, Bluetooth

Price $932
RentSmart: $10.22pw
Websearch: 211014

Palm Zire 21

Memory: 8MB
Screen: 160x160 Monochrome
Processor: TI (ARM) OMAP 311 126MHz
OS Version: Palm OS 5.2.1
Size: 112x74x16mm
Weight: 108g

Features: Personal Organiser

Price $170
Websearch: 210736

Palm Tungsten E

Memory: 32MB
Screen: 320x320 Transflective Colour
Processor: TI (ARM) OMAP 311 126MHz
OS Version: Palm OS 5.2.1
Size: 115x78x12mm
Weight: 131g

Features: Personal Organiser, Word/Excel/Power Point Compatibility, MP3 & Video Playback, Stereo Headphone Jack

Price $326
Websearch: 210737

Palm Tungsten T3

Memory: 64MB
Screen: 320x480 Transflective Colour
Processor: Intel Xscale 400MHz
OS Version: Palm OS 5.2.1
Size: 109x76x13mm
Weight: 156g

Features: Personal Organiser, Word/Excel/PowerPoint Compatibility, MP3 & Video Playback, Stereo Headphone Jack, Voice Memo Recorder, Portrait/Landscape Screen Display, Bluetooth

Price $618
RentSmart: $6.77pw
Websearch: 210738

Palm Tungsten C

Memory: 64MB
Screen: 320x320 Transflective Colour
Processor: Intel PXA255 400MHz
OS Version: Palm OS 5.2.1
Size: 122x78x17mm
Weight: 178g

Features: Personal Organiser, Word/Excel/PowerPoint Compatibility, MP3 & Video Playback, Stereo Headphone Jack, Voice Memo Recorder, Qwerty Keyboard, Wi-Fi

Price $786
RentSmart: $8.62pw
Websearch: 196168

hp iPAQ H1940

Memory: 64MB
Screen: 240x320 Transflective Colour
Processor: Samsung (2410) 266MHz
OS Version: MS Win PocketPC 2003 Pro
Size: 113x70x13mm
Weight: 124g

Features: Voice Recorder, SD Slot (SD/SDIO/MMC), Speaker, Microphone, Stereo Jack, Audio Record/Playback, Bluetooth

Price $548
Websearch: 207330

hp iPAQ H4150

Memory: 64MB
Screen: 240x320 Transflective Colour
Processor: 400MHz Intel XScale tech-based
OS Version: MS Win Mobile 2003
Size: 114x14x71mm
Weight: 132g

Features: Handwriting Recognition, Soft Keyboard, Character Recognition, Voice Recorder, Inking, SDIO/SD/MMC Slot, Speaker, Microphone, Headphone Jack, MP3 Stereo, 32MB Flash ROM, Bluetooth

Price $688
RentSmart: $7.54pw
Websearch: 211181

hp iPAQ H5550

Memory: 128MB
Screen: 240x320 Transflective Colour
Processor: 400MHz Intel XScale tech-based
OS Version: MS Win PocketPC 2003 Prem
Size: 138x84x16mm
Weight: 207g

Features: Handwriting Recognition, Soft Keyboard, Character Recognition, Voice Recorder, Inking, SD/MMC Slot, Speaker, Microphone, Stereo Headphone Jack, Audio Record/Playback, 48MB Flash ROM, Bluetooth

Price $1106
RentSmart: $12.12pw
Websearch: 207332

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Toshiba e400 Pocket PC

Pocket PC 2003 operating system, Intel Xscale PXA-261 at 300MHz processor, colour screen, 64MB RAM system memory plus 32MB (NAND) ROM memory plus 16MB operating system memory. Secure Digital (SD) slot, Infrared Port, built-in speaker and microphone, MP3 and Windows Media. Dimensions: 77x125x10.15mm. Additional software applications: Text-to-Speech, World Clock, Voice Command, Clear Vue, Voice recorder, Auto Backup.

RENTSMART $6.11 PER WEEK> $557

Webcsearch Code 212926

Toshiba e800 Pocket PC

Pocket PC 2003 operating system, Intel Xscale PXA-263 at 400MHz processor, colour display, (480x640 resolution), 128MB RAM system memory plus 32MB (NAND) ROM memory plus 32MB operating system memory, voice record button, integrated Bluetooth or integrated Wi-fi (IEEE 802.11b), SD/CF card slot, infrared port. Dimensions: 77x135x16.7mm. Bluetooth.

- **Wi-Fi** (212528) **$1159**

RENTSMART $12.27 PER WEEK> $1119

Webcsearch Code 212527

o2 XDA II Pocket PC & GSM Phone

Features: 400MHz Intel Xscale PXA263 processor, 128MB SDRAM, 64MB ROM, 3.5" transflective 65,536 colour LCD (240 x 320 pixels), MMC & SD/IO slot, Infrared Port, Bluetooth, IMS/SMS/MMS, full internet browsing, VGA camera (640 x 480 pixels), MPEG camcorder, MP3 media player, speakerphone and voice recorder facility, handwriting recognition, Windows Mobile 2003 for Pocket PC. Size: 70x130x19mm. 190 grams.

RENTSMART $13.70 PER WEEK> $1250

Webcsearch Code 212373

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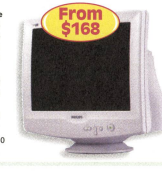
Philips CRT Monitors

Light Frame Technology enables you to brighten and sharpen specific on-screen areas to match the vivid picture quality of TV sets. Real Flat monitors display images without the distortion from curved screens. Image Clear Enhancement (ICE) Technology is an exclusive combination of several picture tube technologies that offers dramatic picture quality improvements.

Websearch	17inch	Dot Pitch/Max Res/Refresh/Hor Scan Freq	Price
203506	107E Beige	0.27mm/1280x1024/85/70KHz	$168
203505	107E Black	0.27mm/1280x1024/85Hz/70KHz	$168
207215	107S Flat Black	0.25mm/1280x1024/87/71KHz	$201
203507	107T Flat Beige	0.25mm/1280x1024/85/71KHz/Light Frame	$201
	19inch	**Dot Pitch/Max Res/Refresh/Hor Scan Freq**	
192464	109B Flat Beige	0.25mm/1920x1440/85/97KHz/Light Frame	$399
130602	109P Flat Beige	0.25mm/1920x1440/85/111KHz/ICE	$612
	21inch	**Dot Pitch/Max Res/Refresh/Hor Scan Freq**	
195386	201B Beige	0.25mm/1920x1440/85/115KHz	$882
	22inch	**Dot Pitch/Max Res/Refresh/Hor Scan Freq**	
195387	202P Flat Beige	0.24mm/2048x1536/85/130KHz/ICE	$1050



Philips LCD Monitors

Superior brightness, high contrast ratio and excellent colour saturation for much better on-screen performance. Zero Bright-Dot monitors are guaranteed to have no bright dots (i.e. Pixels on LCD panels that are stuck permanently bright). Professional models feature DVI digital and VGA analog inputs - you get the best display performance without sacrificing compatibility with older VGA analog devices.

Websearch	15inch	Pixel Pitch/Max.Res/Refresh/Hor.Scan Freq	Price
195625	150S4FG Beige	0.297mm/1024x768/75/61KHz	$490
195623	150S4FB Black	0.297mm/1024x768/75/61KHz	$490
207217	150S4FS Silver	0.297mm/1024x768/75/61KHz	$490
203501	150B4CG Beige	0.297mm/1024x768/75/61KHz/Zero Bright-Dot	$528
203502	150B4CS Silver	0.297mm/1024x768/75H/61KHz/Zero Bright-Dot	$528
207062	150P4CG Beige	0.297mm/1024x768/60/61KHz/DVI/LightFrame	$568
207218	150P4CB Black	0.297mm/1024x768/60/61KHz/DVI/LightFrame	$540
213435	150P4CS Silver	0.297mm/1024x768/60/61KHz/DVI/LightFrame	$540
	17inch		
196139	170S4FG Beige	0.264mm/1280x1024/75/82KHz	$691
196140	170S4FB Black	0.264mm/1280x1024/75/82KHz	$691
203504	170S4FS Silver	0.264mm/1280x1024/75/82KHz	$691
195624	170B4BG Beige	0.264mm/1280x1024/75/82KHz/DVI	$753
196141	170B4BB Black	0.264mm/1280x1024/75/82KHz/DVI	$753
210389	170B4BS Silver	0.264mm/1280x1024/75/82KHz/DVI	$753

19" and 20" LCD monitors also available.

Samsung SyncMaster 17" CRT Flat Monitor (753DFX)

Features: 17"(16" Viewable), 0.20mm dot pitch (horizontal), 1280x1024 @ 66Hz maximum resolution, 1024x768 @ 85Hz recommended, DynaFlat - Infinitely Flat Tube, Smart III surface treatment (anti-static & anti-glare), On Screen Digital display, plug and play compatibility, MPR-II/NUTEK certified. Win/Mac.

$199

Websearch Code 190343

IBM E74R 17" CRT Black Monitor

Horizontal line frequency 69KHz is capable of running 1024x768 flicker-free resolution. On screen display gives a wide range of geometric and color settings. Dot Pitch: 0.27mm dot. Maximum Resolution: 1280x1024 at 60Hz. Maximum Vertical Refresh Rate: 130Hz. Minimum Horizontal Refresh Rate: 30KHz. Screen Type Description: FST.

$255

Websearch Code 192019

Mitsubishi Diamond View 1770H 17" CRT Monitor

A Plug and Play colour monitor ideal for the home, office and most other computer applications. 3 year limited warranty, on-site within 50km of authorised service centres. 0.23 mm horizontal dot pitch. Flicker free high-resolution images - 1024x768 pixel resolution at up to 85Hz refresh rate. Maximum resolution of 1280x1024 pixels at 65 Hz refresh rate. Win/Mac.

- **Diamond View 1998E 19" CRT** (206976) **$338**

$187

Websearch Code 195627

LG 15" Silver LCD Monitor (L1515S)

Features auto-synchronous support from 640x350 up to 1024x768 @ 75Hz. Maximum Resolution: 1024x768, brightness: 250cd/m2, contrast ratio: 400:1, pixel pitch: 0.297mm, LightView brightness control, PC and Mac compatible.

$535

Websearch Code 213263

Samsung SyncMaster 17" Silver LCD Monitor (173V)

Features: 350:1 contrast ratio, pixel pitch of 0.264mm, 1280x1024 maximum resolution, scanning frequency of 30-81 kHz horizontal and 56-75 Hz vertical, advanced image scaling, built-in power adaptor, VESA wall mount compatible.

- **173V 17" Ivory** (197170) **$693**
- **152N 15" Silver/Black** (210726/210727) **$563**

173V 17" Silver

RENTSMART $7.60 PER WEEK*

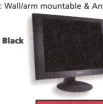
$693

Websearch Code 214041

Sony 15" Black LCD Monitor (SDM-S58)

XGA TFT active matrix LCD panel. Scan range: horizontal - 28-61kHz, Vertical - 48-75kHz. Maximum resolution: 1024x768 @ 75Hz. Display colours: 16.2 million. Contrast ratio: 400:1. Mounting: Wall/arm mountable & Anti-theft lockable. Win/Mac.

- **SDM-S73B 17" Black** (208979) **$762**



Black LCD 15"

$534

Websearch Code 208977

Belkin Wireless Notebook Network Card

802.11G

Belkin networking presents its latest innovation, the 54g Wireless Notebook Network Card. The Card works as an ideal standalone to give you instant networking capabilities.

- Transfer speeds up to 54mbps
- 3 minute Smart Setup Wizard
- Lifetime warranty
- Win/Mac

$139

Websearch Code 196291

Belkin Wireless Desktop Network Card 802.11G

The 54g Wireless Desktop Network Card features breakthrough 54g technology that makes wireless file transfers and downloads faster than ever before.

- Transfer speeds up to 54mbps
- 3 minute Smart Setup Wizard
- Lifetime warranty
- Win/Mac

$139

Websearch Code 196290

Belkin Wireless Cable/ADSL Router 802.11G

The Gateway Router uses the wireless 54g 2.4GHz standard to offer you the widest working range up to 1800 feet and greater interoperability in mixed network. Uses NAT firewall to protect network from outside intrusions by hackers.

- Transfer speeds up to 54mbps
- 3 minute Smart Setup Wizard
- Lifetime warranty
- Win/Mac

$275

Websearch Code 196297

HP VP6110 DLP Projector

(1500 ANSI lumens, SVGA)

800x600 true SVGA, 2000:1 contrast full-on, 2.9 kg. Projection system: Digital Light Processing (DLP) single chip 0.55; SVGA DDR. Lens: F/2.6, f=23.2 to 28.38 mm w/1.2:1 manual zoom and manual focus. Projection distance: Approx 1.5 to 8m. Projected image size: 0.74 to 4.76m (diagonal).

$2577

RENTSMART $25.27 PER WEEK>

Webcsearch Code 213819

EPSON EMP-S1 LCD Projector

(1200 ANSI Lumens, SVGA)

Stylish entry level portable projector ideal for communication and home entertainment. Aspect ratio: 4:3. Lens: F-number - 1.4, focal length - 16.6 mm, Zoom ratio - Digital Zoom (1.0-1.2). Contrast: 400: 1. Range: 15KHz to 92KHz Horizontal, 50Hz to 85Hz Vertical. Weight: 3.2 kg.

$1622

RENTSMART $17.78 PER WEEK>

Webcsearch Code 205657

Sony VPLCX6 LCD Projector

(2000 ANSI Lumens, XGA)

Resolution: XGA (1024 x 768 pixels). Weight 2.7 kg. Accessories: remote control, signal cable, USB cable and software, 8MB Memory Stick. Screen coverage: 40" to 150". Inputs: RGB, Component Composite Video, S-Video. Password authentication security.

$3672

RENTSMART $36.01 PER WEEK>

Webcsearch Code 208566

HP LaserJet 1015

- 600 x 600 dpi
- 14ppm black
- 16MB Ram
- 150 sheet tray
- Parallel/USB
- Win/Mac
- **HP 1010** (209726) **$327**

1015 Webcsearch Code 209727 **$422**

HP LaserJet 1300N

- 1200 x 1200dpi
- 20ppm black
- 16MB Ram
- 250 sheet tray
- Parallel/USB
- Win/Mac
- Ethernet ready
- **HP 1300** (196460) RentSmart $8.41 **$767**

1300N RENTSMART $13.14 PER WEEK> **$1199** Webcsearch Code 196461

HP LaserJet 2300N

- 1200 x 1200dpi
- 25ppm black
- 48MB Ram
- 350 sheet input
- Parallel/USB
- Win/Mac
- Ethernet ready
- **HP 2300** (196462) RentSmart $15.38 **$1403**
- **HP 2300D** (196411) RentSmart $16.72 **$1525**

2300N RENTSMART $19.82 PER WEEK> **$1808** Webcsearch Code 196363

HP LaserJet 4200N

- 1200 x 1200dpi
- 35ppm black
- 48MB Ram
- 600 sheet input
- Parallel
- Win/Mac
- Ethernet ready
- **HP 4200** (196515) RentSmart $19.88 **$1814**
- **HP 4200DTN** (195314) RentSmart $32.47 **$3311**

4200N RENTSMART $24.87 PER WEEK> **$2536** Webcsearch Code 196185

HP Colour LaserJet 1500

- 600 x 600dpi
- 16ppm black
- 4ppm colour
- 16MB Ram
- Up to 375 sheet input
- USB Connection
- Win/Mac

RENTSMART $16.43 PER WEEK> **$1499** Webcsearch Code 206340

HP Colour LaserJet 2500N

- 600 x 600dpi
- 16ppm black, 4ppm colour
- 64MB Ram
- 100 sheet multi-purpose tray & 250 sheet input tray
- Win/Mac
- Ethernet ready
- **HP 2500** (192925) RentSmart $18.55 **$1692**

2500N RENTSMART $23.56 PER WEEK> **$2149** Webcsearch Code 195285

HP Colour LaserJet 3500N

- 600 x 600dpi
- 12ppm black & colour
- 64MB Ram
- Up to 350 sheet input
- USB 2.0
- Win/Mac
- Ethernet ready

RENTSMART $22.20 PER WEEK> **$2025** Webcsearch Code 212689

HP Colour LaserJet 3700

- 600 x 600dpi
- 16ppm black & colour
- 64MB Ram
- Up to 350 sheet input
- USB & parallel
- Win/Mac

RENTSMART $26.19 PER WEEK> **$2670** Webcsearch Code 212691

HP Colour LaserJet 4600

- 600 x 600dpi
- 16ppm black & colour
- 96MB Ram
- Up to 600 sheet input
- Parallel
- Win

RENTSMART $31.37 PER WEEK> **$3199** Webcsearch Code 196385

Lexmark E323T Laser Printer

- 600 x 600dpi
- 19ppm black
- 16MB Ram
- 250 sheet input
- USB/Parallel
- Win/Mac
- **Lexmark E323TN** (197578) RentSmart $12.81 **$1169**

E323T RENTSMART $8.16 PER WEEK> **$744** Webcsearch Code 197577

Lexmark T630N Laser Printer

- 1200 x 1200dpi
- 33ppm black
- 64MB Ram
- Up to 350 sheet input
- USB
- Win/Mac
- Ethernet ready

RENTSMART $18.62 PER WEEK> **$1699** Webcsearch Code 207468

Lexmark Colour C720N Laser Printer

- 600 x 600 dpi
- 24ppm black
- 6ppm colour
- 32MB Ram
- 250 sheet tray
- Parallel/USB
- Win/Mac
- Ethernet ready
- **C720** (194980) RentSmart $20.27 **$1849**
- **C720DN** (196481) RentSmart $39.14 **$4188**

C720N RENTSMART $23.55 PER WEEK> **$2148** Webcsearch Code 196370

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Fuji Xerox DocuPrint 240A

- 1200 x 1200 dpi
- 24ppm black
- 64MB Ram
- 700 sheet input
- USB 1.1
- Win / Mac
- Ethernet ready
- 12 month on site warranty

RENTSMART $17.10 PER WEEK> **$1560**
Websearch Code 214490

Fuji Xerox DocuPrint 205 A3

- 1200 x 1200 dpi
- 20ppm black
- 64MB Ram
- 400 sheet input
- USB 1.1
- A4 / A3 Printing
- Win / Mac
- Ethernet ready
- 12 month on site warranty

RENTSMART $19.62 PER WEEK> **$1790**
Websearch Code 214489

Fuji Xerox DocuPrint C1618 Colour

- 1200 x 1200 dpi
- 16ppm black & colour
- 64MB Ram
- 600 sheet input
- USB 1.1
- Win / Mac
- Ethernet ready
- 12 month on site warranty

RENTSMART $23.39 PER WEEK> **$2385**
Websearch Code 213192

HP DAT 40i Tape Drive

The HP Surestore DAT40 provides reliable, cost-effective data protection for entry-level to mid-range servers and high-end workstations where backup speed is an issue. The world's fastest DDS-4 drive, it stores 40 GB compressed within two hours, making it ideal for storage-hungry applications. DAT40's low cost of ownership delivers real value compared to other devices.

$1815
RENTSMART $19.90 PER WEEK>
Websearch Code 195691

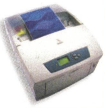
Fuji Xerox Phaser 8200N Colour

- 1000 x 1000 dpi
- 16ppm black and colour
- 64MB Ram
- 200 sheet input
- USB 1.1
- Solid Ink Technology
- Win / Mac
- Ethernet ready
- 12 month on site warranty

RENTSMART $34.52 PER WEEK> **$3520**
Websearch Code 204619

Fuji Xerox Phaser 6250N Colour

- 2400 x 2400 dpi
- 24ppm black and colour
- 256MB Ram
- 600 sheet input
- USB 2
- Win / Mac
- Ethernet ready
- 12 month on site warranty



RENTSMART $42.33 PER WEEK> **$4529**
Websearch Code 211811

Fuji Xerox DocuPrint C2428N

- 1200 x 1200 dpi
- 24ppm black & colour
- 128MB Ram
- 650 sheet input
- USB 1.1
- Win / Mac
- Ethernet ready

RENTSMART $45.68 PER WEEK> **$4888**
Websearch Code 214448

Brother HL5040 Laser Printer

- 600 x 600 dpi
- 16ppm black
- 8MB Ram
- 250 sheet tray
- Parallel / USB
- Win/Mac
- **HL5050** (195666) **$569**

RENTSMART $6.24 PER WEEK> **$469**
Websearch Code 195276

Brother MFC4800 Multifunction Printer

- 600 x 600 dpi
- 10ppm black print and copy
- 2MB Ram
- Fax
- 200 sheet tray
- Parallel / USB
- Win/Mac

RENTSMART $6.46 PER WEEK> **$589**
Websearch Code 195134

Brother MFC9180 Multifunction Printer

- 600 x 600 dpi
- 10ppm black print and copy
- 8MB Ram
- Fax
- 200 sheet tray
- Parallel / USB
- Win/Mac

RENTSMART $7.66 PER WEEK> **$699**
Websearch Code 192722

$2006
RENTSMART $21.99 PER WEEK>
Websearch Code 205470

IBM 160/320GB SDLT Tape Drive

- 16MBps (32MBps compressed)
- Storage capacity: 160GB (320GB compressed)
- Base drive
- Mounting hardware
- 76.2cm (30") LVD cable
- Trial software
- Read and write: SDLT 220 Read: DLT 8000, DLT 7000, DLT 4000 and DLTVS 80

$7700
RENTSMART $66.81 PER WEEK>
Websearch Code 200890

Epson EPL-6200 Laser Printer

- 1200 x 1200 dpi
- 20ppm black
- 8MB Ram
- 250 sheet tray
- Parallel / USB
- Win/Mac

RENTSMART $7.23 PER WEEK> **$660**
Websearch Code 211807

Epson Colour C900N Laser Printer

- 600 x 600dpi
- 16ppm black, 4ppm colour
- 64MB Ram
- 200 sheet multi-purpose tray
- Win/Mac
- Ethernet ready
- **Epson C900** (196840) RentSmart $13.46 **$1228**

C900N
RENTSMART $13.14 PER WEEK> **$1199**
Websearch Code 200445

Epson Colour AL-C1900 Laser Printer

- 600 x 600 dpi
- 16ppm black
- 4ppm colour
- 96MB Ram
- 200 sheet tray
- Parallel / USB
- Win/Mac
- Ethernet ready

RENTSMART $15.95 PER WEEK> **$1455**
Websearch Code 196841

Computer Products at Rock Bottom Prices

Belkin Cable IEEE

- **Belkin Cable IEEE 1394, 4 Pin to 4 90cmm** (190902) **$15**
- **Belkin Cable IEEE 1394, 4 Pin to 4 1.8m** (190898) **$25**
- **Belkin Cable IEEE 1394, 4 Pin to 4 Pin 4.5m** (190903) **$39**
- **Belkin Cable IEEE 1394, 6 Pin to 4 90cm** (190533) **$16**
- **Belkin Cable IEEE 1394, 6 Pin to 4 1.8m** (190809) **$25**
- **Belkin Cable IEEE 1394, 6 Pin to 4 4.5m** (190899) **$39**
- **Belkin Cable IEEE 1394, 6 Pin to 6 90cm** (190900) **$16**
- **Belkin Cable IEEE 1394, 6Pin to 6 1.8m** (190897) **$25**
- **Belkin Cable IEEE 1394, 6 Pin to 6 4.5m** (212713) **$39**

We Stock Firewire 800 Cables

Belkin Patch Cable CAT5e

- **Belkin Patch Cable CAT5e Snagless 1m** (212655) **$7**
- **Belkin Patch Cable CAT5e Snagless 5m** (212657) **$15**
- **Belkin Patch Cable CAT5e Snagless 10m** (212658) **$20**
- **Belkin Patch Cable CAT5e Snagless 15m** (212659) **$25**

We Stock CAT6 Cables

Belkin USB Peripheral Cables

- **Belkin USB Peripheral Cable A-B 1.8m** (BEL148) **$12**
- **Belkin USB Peripheral Cable A-B 3m** (BEL149) **$17**
- **Belkin USB Peripheral Cable A-B 5m** (190572) **$22**

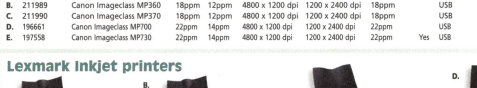
Canon Inkjets Printers

	Webcode	Product Description	Black	Colour	Resolution	USB	Parallel	Platform	Price
A.	209228	Canon S200SPX Inkjet Printer	5ppm	3ppm	2880 x 720 dpi	Yes		Win/Mac	$75
B.	208752	Canon i250 Inkjet Printer	12ppm	9ppm	4800 x 1200 dpi	Yes		Win/Mac	$89
C.	208753	Canon i350 Inkjet Printer	16ppm	11ppm	4800 x 1200 dpi	Yes		Win/Mac	$125
D.	211985	Canon i455 Inkjet Printer	18ppm	12ppm	4800 x 1200 dpi	Yes		Win/Mac	$159
E.	209573	Canon i560 Inkjet Printer	22ppm	15ppm	4800 x1200dpi	Yes	Yes	Win/Mac	$265
F.	209574	Canon i865 Inkjet Printer	23ppm	16ppm	4800 x 1200 dpi	Yes	Yes	Win/Mac	$349
G.	195870	Canon i70 Inkjet Printer **(Portable)**	13ppm	9ppm	4800 x 1200 dpi	Yes		Win/Mac	$379
H.	212890	Canon i965 Inkjet Printer	10ppm	10ppm	4800 x 1200 dpi	Yes		Win/Mac	$489
I.	210668	Canon i905D Inkjet Printer	8ppm	7ppm	4800 x 1200 dpi	Yes		Win/Mac	$529
J.	196658	Canon i6100 Inkjet Printer **(A3+)**	12ppm	9ppm	2400 x1200 dpi	Yes	Yes	Win/Mac	$529
K.	196659	Canon i6500 Inkjet Printer **(A3+)**	17ppm	12ppm	4800 x 1200 dpi	Yes	Yes	Win/Mac	$719
L.	196660	Canon i9100 Inkjet Printer **(A3+)**	6ppm	6ppm	4800 x 1200 dpi	Yes		Win/Mac	$1039

Canon Multifunction Printers

	Websearch	Product Description	Black	Colour	Print Resolution	Scan Resolution	Copy - Black	Fax	Connectivity	Platform	Price
A.	195871	Canon Imageclass MPC190	14ppm	10ppm	2400 x 1200 dpi	600 x 1200 dpi	14ppm		USB	Win	$175
B.	211989	Canon Imageclass MP360	18ppm	12ppm	4800 x 1200 dpi	1200 x 2400 dpi	18ppm		USB	Win	$265
C.	211990	Canon Imageclass MP370	18ppm	12ppm	4800 x 1200 dpi	1200 x 2400 dpi	18ppm		USB	Win	$344
D.	196661	Canon Imageclass MP700	22ppm	14ppm	4800 x 1200 dpi	1200 x 2400 dpi	22ppm		USB	Win	$395
E.	197558	Canon Imageclass MP730	22ppm	14ppm	4800 x 1200 dpi	1200 x 2400 dpi	22ppm	Yes	USB	Win	$499

Lexmark Inkjet printers



	Webcode	Product Description	Black	Colour	Resolution	USB	Parallel	Platform	Price
A.	202448	Lexmark Z603 Inkjet Printer	14ppm	8ppm	4800 x 1200 dpi	Yes		Win/Mac	$63
B.	202449	Lexmark Z605 Inkjet Printer	14ppm	8ppm	4800 x 1200 dpi	Yes		Win/Mac	$79
C.	202496	Lexmark Z705 Inkjet Printer	17ppm	10ppm	4800 x 1200 dpi	Yes		Win/Mac	$118
D.	209513	Lexmark P707 Photo Inkjet Printer	17ppm	10ppm	4800 x 1200 dpi	Yes		Win/Mac	$157

Lexmark Multifunction printers

	Webcode	Product Description	Black	Colour	Print Resolution	Scan Resolution	Copy - Black	Fax	Connectivity	Platform	Price
A.	197574	Lexmark X1150 Multifunction Printer	14ppm	8ppm	4800 x 1200 dpi	600 x 1200 dpi	13ppm		USB	Win/Mac	$134
B.	211102	Lexmark P3150 Multifunction Printer	17ppm	10ppm	4800 x 1200 dpi	600 x 1200 dpi	14ppm		USB	Win/Mac	$157
C.	202351	Lexmark X5150 Multifunction Printer	19ppm	14ppm	4800 x 1200 dpi	600 x 1200 dpi	16ppm		USB	Win/Mac	$197
D.	211187	Lexmark X6150 Multifunction Printer	19ppm	15ppm	4800 x 1200 dpi	1200 x 4800 dpi	16ppm	Yes	USB	Win	$317
E.	207053	Lexmark X6170 Multifunction Printer	19ppm	15ppm	4800 x 1200 dpi	1200 x 4800 dpi	16ppm	Yes	USB	Win	$394

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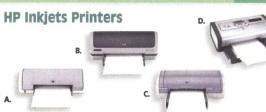
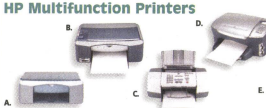
HP Inkjets Printers



	Webcode	Product Description	Black	Colour	Resolution	USB	Parallel	Platform	Price
A.	197427	HP Deskjet 3550 Inkjet Printer	14ppm	10ppm	2400 x 1200 dpi	Yes		Win/Mac	$86
B.	207744	HP Deskjet 3650 Inkjet Printer	17ppm	12ppm	Up to 4800dpi	Yes		Win/Mac	$129
C.	208633	HP Deskjet 5160 Inkjet Printer	19ppm	14ppm	Up to 4800dpi	Yes		Win/Mac	$172
D.	210213	HP Photosmart 7260 Inkjet Borderless			Up to 4800dpi		Yes	Win/Mac	$172
E.	207745	HP Deskjet 5652 Inkjet Printer	21ppm	15ppm	Up to 4800dpi	Yes	Yes	Win/Mac	$255
F.	210214	HP Photosmart 7660 Inkjet Borderless			4800 x 1200dpi	Yes	Yes	Win/Mac	$259
G.	192268	HP Deskjet 1180c Inkjet Printer **(A3)**	8ppm	7ppm	Up to 1200dpi	Yes	Yes	Win/Mac	$387
H.	192097	HP Deskjet 450cbi Inkjet Printer **(Portable)**	9ppm	8ppm	Up to 4800dpi	Yes		Win/Mac	$473
I.	210212	HP Photosmart 7960 Inkjet Printer			4800 x 1200dpi	Yes		Win/Mac	$602

HP Multifunction Printers

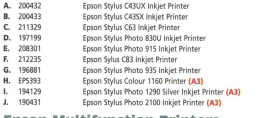


	Websearch	Product Description	Black	Colour	Print Resolution	Scan Resolution	Copy - Black	Fax	Connectivity	Platform	Price
A.	210591	HP Officejet 7SC1210	12ppm	10ppm	1200 x 1200 dpi	600 x 2400 dpi	12ppm		USB	Win/Mac	$171
B.	211676	HP Officejet 7SC1350	17ppm	12ppm	600 x 600 dpi	600 x 600 dpi	17ppm		USB	Win/Mac	$258
C.	197285	HP Officejet 7SC4110	12ppm	10ppm	600 x 600 dpi	600 x 1200 dpi	12ppm	Yes	USB	Win/Mac	$259
D.	210832	HP Officejet 7SC2310	21ppm	15ppm	4800 x 1200 dpi	1200 x 2400 dpi	21ppm		USB	Win/Mac	$336
E.	214243	HP Officejet 7SC5510	17ppm	12ppm	1200 x 1200 dpi	600x x2400 dpi	17ppm	Yes	USB	Win/Mac	$345
F.	210833	HP Officejet 7SC2410	21ppm	15ppm	4800 x 1200 dpi	1200 x 2400 dpi	21ppm	Yes	USB	Win/Mac	$432
G.	194905	HP Officejet 6110	19ppm	15ppm	1200 x 1200 dpi	1200 x 2400 dpi	19ppm	Yes	USB	Win/Mac	$516
H.	211675	HP Officejet 7SC2510	21ppm	15ppm	480 x 1200 dpi	1200 x 2400 dpi	21ppm	Yes	USB	Win/Mac	$602
I.	197333	HP Officejet 7130	22ppm	18ppm	2400 x 1200 dpi	1200 x 4800 dpi	22ppm	Yes	USB	Win/Mac	$861

Epson Inkjet Printers

	Webcode	Description	Black	Colour	Resolution	USB	Parallel	Platform	Price
A.	200432	Epson Stylus C43UX Inkjet Printer	12ppm	5.4ppm	Up to 2880dpi	Yes		Win/Mac	$85
B.	200433	Epson Stylus C45SX Inkjet Printer	12ppm	5.4ppm	Up to 2880dpi		Yes	Win	$105
C.	211329	Epson Stylus C63 Inkjet Printer	17ppm	14ppm	5760 x 1440dpi	Yes	Yes	Win/Mac	$157
D.	197199	Epson Stylus Photo 830U Inkjet Printer	14ppm	14ppm	5760 x 720dpi	Yes		Win/Mac	$222
E.	208301	Epson Stylus Photo 915 Inkjet Printer	7.8ppm	3.2ppm	5760 x 720dpi	Yes		Win/Mac	$268
F.	212235	Epson Sylus C83 Inkjet Printer	22ppm	12ppm	5760 x 1440dpi	Yes	Yes	Win/Mac	$272
G.	196881	Epson Stylus Photo 935 Inkjet Printer	8.5ppm	8.5ppm	Up to 5760dpi	Yes	Yes	Win/Mac	$517
H.	EPS393	Epson Stylus Colour 1160 Printer **(A3)**	9.5ppm	9.2ppm	1440 x 720 dpi	Yes	Yes	Win/Mac	$543
I.	194129	Epson Stylus Photo 1290 Silver Inkjet Printer **(A3)**	9.4ppm	9ppm	Up to 5760dpi	Yes	Yes	Win/Mac	$939
J.	190431	Epson Stylus Photo 2100 Inkjet Printer **(A3)**	7.5ppm	7.3ppm	2880 x 1440dpi	Yes	Yes	Win/Mac	$1702

Epson Multifunction Printers



	Webcode	Description	Black	Colour	Print Resolution	Scan Resolution	Copy-Black	Connectivity	Platform	Price
A.	196271	Epson Stylus CX3100	14ppm	14ppm	5760 x 720dpi	600 x 1200dpi	10ppm	USB	Win/Mac	$222
B.	211183	Epson Stylus CX5300	22ppm	11ppm	5760 x 1440dpi	1200 x 2400dpi	15ppm	USB	Win/Mac	$342
C.	212404	Epson RX510 (Photo)	17ppm	10ppm	5760 x 1400 dpi	2400 x 4800 dpi	10ppm	USB	Win/Mac	$513

HP Papers

A4 Everyday Photo Semi Gloss 170gsm	
100 Sheets (210657)	$17
A4 Premium Inkjet 98gsm	
200 Sheets (192820)	$33
A4 Everyday Paper 48gsm	
1 Ream (208028)	$8
5 Reams (196203)	$39

Canon Papers

A4 High Resolution 110gsm	
50 Sheets (192789)	$13
200 Sheets (194579)	$33
A3 High Resolution 110gsm	
20 Sheets (196358)	$10
100 Sheets (196198)	$42
A3 Coated 80gsm	
20 Sheets (196196)	$7

Kodak Papers

4 x 6" Picture Paper	
20 Sheets (195432)	$10
40 Sheets (212721)	$15
4 x 6" Premium Picture Paper	
25 Sheets (208417)	$16
75 Sheets (208414)	$32
A4 Everyday Picture Paper 165gsm	
20 Sheets (195444)	$10
100 Sheets (208412)	$35
A4 Picture Paper Glossy 190gsm	
25 Sheets (195434)	$15
75 Sheets (202113)	$33
A4 Premium Picture Paper Glossy 220gsm	
15 Sheets (189563)	$15
50 Sheets (189631)	$33
A4 Premium Picture Paper Satin 220gsm	
15 Sheets (189301)	$15
50 Sheets (195442)	$33

Epson Papers

Photo Quality Inkjet Paper	
100 Sheets	
A4 (EPS451)	$27
A3 (196187)	$64
A3+ (194822)	$79
Matte Heavyweight Paper	
50 Sheets	
A4 (EPS454)	$27
A3 (189993)	$65
A3+ (200355)	$81
Photo Glossy Paper	
20 Sheets	
A4 (190757)	$20
A3 (EPS455)	$68
A2 (196329)	$105
Premium Photo Glossy Paper	
50 Sheets 4 x 6" (211436)	$14
20 Sheets A4 (EPS001)	$32
A3 (EP5416)	$78
A3+ (200410)	$115

Computer Products at Rock Bottom Prices

SanDisk Cruzer Mini

The fastest and easiest way to move your data. Cruzer Mini is Hi-speed USB 2.0 certified for fast data transfer.

128MB
$66
Webcsearch Code 214564

256MB
$99
Webcsearch Code 213845

512MB
$199
Webcsearch Code 214670

Nexdisk USB Storage Device

USB 1.1 / 2.0 support. No external power required. Password Function - Nexdisk has the ability to lock itself with password; Bootable Disk Function.

128MB
$99
Webcsearch Code 190377

256MB
$189
Webcsearch Code 192193

512MB
$359
Webcsearch Code 193334

Sony Micro Vault USB 2.0 Storage Device

The drives feature improved Security Zone software ensuring that sensitive personal and business information is kept secure and are hoot powered.

64MB
$77
Webcsearch Code 195902

128MB
$102
Webcsearch Code 195903

256MB
$169
Webcsearch Code 195904

Netgear Wireless PCMCIA Adapter (WG511)

- Works with both IEEE 802.11b and 802.11g
- Speeds of up to 54 Mbps
- Office roaming for notebook PC users
- Shared broadband Internet access and resources.
- Wireless LAN Manager for location-specific profiles
- 128-bit WEP encryption

802.11B MA521	802.11G WG511
$56	**$100**
Webcsearch Code...203250	Webcsearch Code...195607

Netgear Wireless PCI Adapter (WG311)

- High-speed 802.11g at 2.4 GHz
- First-time-ever wireless video streaming
- Dynamic rate shifting
- 40/64 & 128-bit Wired Equivalency Protection encryption
- Virtual Private Network pass-through

802.11B MA311	802.11G WG311
$120	**$95**
Webcsearch Code...213270	Webcsearch Code...207056

Netgear Wireless USB Adapter (WC121)

- Works with both IEEE 802.11b and 802.11g
- USB 2.0 powered
- Sleek, attractive platinum casing
- Easy setup via Smart Wizard install assistant

802.11B MA111	802.11G WG121
$67	**$107**
Webcsearch Code...197322	Webcsearch Code...211346

Netgear Wireless Access Point (WG602)

- Works with both IEEE 802.11b and 802.11g
- Provides the highest available level of WEP encryption 128bit for both
- MAC address authentication offers enhanced security by ensuring only authorised users can access the network
- Dynamic rate shifting according to environmental conditions achieves the fastest possible connections

802.11B ME103	802.11G WG602
$266	**$169**
Webcsearch Code...203258	Webcsearch Code...195606

Netgear Wireless Access Point and Print Server (FWG114P)

- True Firewall with Stateful Packet Inspection and Intrusion Detection
- Built-in 54 Mbps/802.11g Wireless Access Point
- Integrated USB Print Server & Network Address
- Translation (NAT) Routing
- DR-9 port included to support an ISDN or analogue modem connection
- Easy to use Smart Wizard Install Assistant

802.11B FM114P	802.11G FWG114P
$213	**$324**
Webcsearch Code...193171	Webcsearch Code...211347

Netgear Wireless Access Point and Router (WGR614)

- Faster Speeds up to 54 Mbps in 2.4 GHz mode
- Share your Cable/DSL Internet connection – with or without wires
- Smart Wizard: automatically detects and connects to your ISP
- True Firewall with SPI and NAT protection
- Easy set up with interactive install tutorial

802.11B MR814	802.11G WGR614
$138	**$151**
Webcsearch Code...195602	Webcsearch Code...198083

Netgear Wireless Ethernet Bridge (WGE101)

- Multi-device bridging mode supports connection to multiple Ethernet devices via a hub, router, or switch.
- Detachable antenna creates uniform blanket coverage without dead spots
- Supports Ad-Hoc mode ideal for small networks, it can communicate with other devices w/o requiring an access point.

802.11B ME101	802.11G WGE101
$136	**$176**
Webcsearch Code...209822	Webcsearch Code...207057

Netgear 10/100 Fast Ethernet Switch (FS608)

- Plug and Play installation, no configuration
- Auto-detects speed and duplex
- Auto Uplink makes the right connection
- 100 Mbps access/200 Mbps in full-duplex
- Vertical option saves space on your desk

5 Port FS605	8 Port FS608
$62	**$76**
Webcsearch Code...194999	Webcsearch Code...195000

Netgear 10/100 Fast Ethernet Switch (JFS524)

- 24 10/100 ports
- Plug and Play
- Auto-detects speed and duplex
- Auto Uplink Technology makes the right connection
- Rack mount kit included

16 Port FS116	24 Port JFS524
$169	**$262**
Webcsearch Code..NET205	Webcsearch Code...195597

Netgear Cable/DSL Prosafe VPN Firewall Router (FVS318)

- Initiates up to 8 IPSec VPN tunnels simultaneously
- Stateful Packet Inspection Firewall with VPN pass-through and routing
- Eight ultra-fast 10/100 Mbps LAN ports
- Securely connects mobile workforce and branch offices to main office resources
- Easy-to-use Web browser-based setup, configuration and remote management

$227
Webcsearch Code 193164

Netgear ADSL Modem (DM602)

- Ethernet and USB connections
- 8 mbps high-speed Internet surfing
- Use phone while you're online
- Supports all ADSL networks
- Simple to use

$122
Webcsearch Code 195411

Netgear Cable/DSL Web Safe Router (RP614)

- Unique Smart Wizard and Install Assistant make setup a breeze
- Lightning fast cable/DSL Internet sharing with
- Integrated 4-port switch
- NAT Firewall with VPN pass-through protects against hackers
- Connects up to 253 network users
- Parents may restrict and monitor access to inappropriate Web sites
- Instant alerts and regular e-mail notification of browser activity

$103
Webcsearch Code 208503

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Call 1300 300 003 or visit: www.ixwit.com.au as prices may change due to daily fluctuations and online discounts.

1300 300 003

VISA MasterCard AMERICAN EXPRESS DINERS CLUB RENTSMART

D-Link Wireless Lan PCI Adapter (DWL-G520+)

Features:

- 802.11b, 80211b+, and 80211g standard
- 54Mbps Speed on 2.4GHz Frequency Range
- WEP user-selectable 64/128/256-bit data encryption security
- IEEE 802.1 x security
- Tri-Band

Websearch Code 200292 **$143**

D-Link Wireless Lan PCMCIA Adapter (DWL-G650+)

Features:

- 802.11b, 80211b+, and 80211g standard
- 54Mbps Speed on 2.4GHz Frequency Range
- WEP user-selectable 64/128/256-bit data encryption security
- IEEE 802.1 x security
- Tri-Band

Websearch Code 210414 **$75**

D-Link Wireless Lan Access Point (DWL-2000AP+)

Features:

- 802.11b, 80211b+, and 80211g standard
- 54Mbps Speed on 2.4GHz Frequency Range
- WEP user-selectable 64/128/256-bit data encryption security
- IEEE 802.1 x security
- 10/100Mbps LAN Port
- Tri-Band

Websearch Code 200294 **$245**

Muzio USB Storage Device

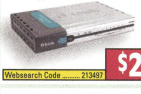
With built in swiveling USB 1.1 connector, just connect to a PC or notebook without a cable. 9 Band delicate EQ, 7 EQ Mode support. OLED provides a clear and neat display at a glance. Connect any audio device and encode to an MP3 file (supports WMA format). FM Radio auto-search and record function. Digital voice recording and saving with the touch of a button.

256MB **$349**
Websearch Code 211998

D-Link VPN Ethernet Broadband Router (DI-808HV)

Features Include:

- Ipsec VPN Support
- VPN pass through
- GUI interface for easy configuration
- 8x 10/100 Ethernet LAN ports, 1x 10/100 Ethernet WAN port
- Internal DMZ port
- NAT support



Websearch Code 213497 **$219**

D-Link Wireless Lan USB Adapter (DWL-120+)

Features:

- 802.11b+ wireless LAN standard
- 2.4GHz frequency band
- USB 1.1 connection to notebook or desktop
- Up to 22Mbps data transfer rate
- Security with 64/128/256-bit WEP data encrypt.
- Supports Windows 98 SE, 2000, ME, XP
- Flip-up, foldable, adjustable antenna
- Compact pocket-sized design

Websearch Code 208973 **$76**

D-Link Wireless Router with 4-port Switch and Parallel Print Server (DI-724P+)

Features:

- Capable of data transfer rates of up to 54Mbps
- Compatible with 802.11b and 80211.b+ products
- Built in 4-port switch for connectivity to multiple computers
- WAN port
- Virtual Sessions with VPN pass through
- Built in parallel printer port

Websearch Code 213498 **$267**

Apacer Handy Steno USB2 Storage Device

Apacer Handy Steno 2 is a perfect storage solution for you to store valuable data anytime, anywhere. The newly equipped USB2 gives you lightening speed in file transfer and saves you time.

- **64MB (212978) $59**
- **256MB (212980) $139**
- **512MB (212981) $265**

128MB **$93**
Websearch Code 212979

NetComm Wireless PCMCIA Card (NP5430)

NetComm's new NP5430 32-Bit 11g Wireless PCMCIA Card makes it quicker and easier for laptop users to keep up to date with e-mail, utilise network resources such as printer and storage and access the Internet. NetComm's WLAN solutions deliver standards-based 802.11g connectivity, protected with the latest 128-Bit WEP security keeping your communication safe from prying eyes.

NP5420 (PCI)	NP5430 (PCMCIA)
$153	**$130**
Websearch Code...209969	Websearch Code...207982

NetComm 802.11g Wireless Access Point (NP5400)

Access Point combines the enhanced performance of the new 802.11g standard with the widely deployed 802.11b standard to protect your investment in your existing Wireless LAN infrastructure.

NP5400
Websearch Code 207981 **$239**

NetComm ADSL Ethernet Modem/Router and 4 Port Switch (NB1300)

This new, enhanced version of NetComm's top-selling multi-user Ethernet ADSL modem includes USB functionality, advanced Router features as well as a four-port Ethernet switch to connect a network of computers to an ADSL Internet service, allowing more than one user to share a single ADSL account.

NB1300	NB1300 Plus 4
$151	**$201**
Websearch Code...193365	Websearch Code...210006

Apacer Audio Steno USB Storage Device

A USB 1.1 flash drive with MP3 player and voice recorder. All functions and features are packed in a compact, easy-to-carry design. Enjoy the music and store data wherever you need. Features up to 12 hours of playback with Alkaline Battery, LCD display with backlight, compact and stylish design, one-button recording.

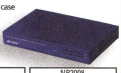
- **64MB (210130) $165**

128MB **$189**
Websearch Code 210130

NetComm 10/100Mbps SmartSwitch (NP2008)

Features:

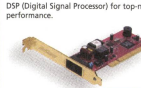
- 10/100Mbps half/full duplex auto-sensing switch ports
- Intelligent 'Store & Forward Technology'
- Easy Plug & Play configuration
- Increase network speed and decrease chatter
- Durable metal case
- Supports most popular Ethernet protocols



NP2005	NP2008
$82	**$109**
Websearch Code NET243	Websearch Code NET242

NetComm Internal V92 56K Modem (IN5699)

Now on an elegant red and gold circuit board, the new, updated, InModem 56K delivers high-speed voice, data and fax transmission in an easy-to-install and trouble-free PCI format.
In addition to its up-to-date feature-set, the new InModem 56K features its own on board DSP (Digital Signal Processor) for top-notch CPU performance.



Websearch Code 130964 **$33**

NetComm Roadster V.92 Data/Fax/Voice Modem (AM5055)

Features:

- QuickConnect cuts the time it takes to connect;
- V.44 compression speeds Web browsing and download speeds.

The Roadster builds on the Connexant heritage of the Roadster family of proven reliability, increased data transfer speeds and optimised connection rates.

AM5055 (USB)	AM5698 (Serial)
$173	**$152**
Websearch Code 202943	Websearch Code 202951

APRIL/MAY 2004

Computer Products at Rock Bottom Prices

Juzt Reboot

No matter how your System/Data is destroyed; either by virus attacks, deletion, formatting, overwrites, fdisk, modification or improper shutdowns, Just Reboot and your system will recover instantly. No other additional system/data recovery operations are required. Support5 hard disks of any size and capacity.

Free 64mb Pocki USB drive. Limited time - while stocks last!

$139
Websearch Code 191590

Spirit TV Tuner Card

View cable and free-to-air TV on your PC, with a full-function 16-channel TV tuner and remote control. You can also capture still or motion video images from TV's, VCR's or Camcorders.

$117
Websearch Code 202947

Graphix Studio Designer 9x6

With a 9" x 6" working area, 1024 levels of pressure sensitivity and effective tablet control panel for fine tuning. This tablet snatched a best buy award from PC User Magazine (March 2002) and is setting itself up to be an indispensable tool for anyone wanting more out of their PC.

$259
Websearch Code 195249

Iomega Zip Drives 100MB & 250MB

Reliable, versatile and cost-effective. You can choose from 100MB and 250MB configurations to protect and secure your important data.

- **100MB USB** (IOM151) **$129**
- **250MB Internal Atapi** (208406) **$135**

250MB USB
Websearch Code 201140
$215

Iomega 750MB Zip Drive

Iomega Zip drives come with easy-to-use software and use durable password protected disks that fit into your shirt pocket. The 750MB drive offers the ultimate in capacity, speed and security, for your business, home and enterprise needs. Chose the best drive for you; USB2, Firewire or Internal Atapi.

- **Firewire** (211678) **$289**
- **Atapi** (197261) **$165**

750MB USB2
Websearch Code 213519
$275

Iomega Hard Drives

Iomega hard drives are compact and rugged with hot plug & play capability. They deliver high capacity, flexibility and performance for today's data-intensive applications and digital video/audio files. Iomega hard drives come with Iomega Automatic Backup and Symantec Norton Ghost 2003 Disaster Recovery software to protect your files and are Mac & PC compatible to make switching easy.

- **120GB USB2/Firewire** (207786) **$359**
- **250GB USB/Firewire** (211846) **$539**

80 MB External USB2
Websearch Code 207973
$275

Iomega Zip media

Iomega Zip media was a storage breakthrough when it was introduced in 1995. With large capacities of 100MB, 250MB and 750MB, Zip disks allow you to back up, transfer, secure and archive all of your critical data - all while being portable and password protected.

Websearch	Product Description	Quantity	Price
214157	Iomega Zip 100MB Disk	1 Pack Win/Mac	$17
214158	Iomega Zip 100MB Disks	10 Pack Win/Mac	$149
214159	Iomega Zip 250MB Disk	1 Pack Win/Mac	$20
214160	Iomega Zip 250MB Disks	2 Pack Win/Mac	$38
214161	Iomega Zip 250MB Disks	10 Pack Win/Mac	$159
209183	Iomega Zip 750MB Disk	2 Pack Win/Mac	$45
207603	Iomega Zip 750MB Disks Grey	10 Pack Win/Mac	$187

Iomega CD-RW Predator USB2 40x24x40x

High speed external USB 2.0 CD-RW drive. Speed: 40x write, 24x re-write, 40x read (USB 2.0); 4x write, 4x re-write, 6x read (USB 1.1). Includes buffer under-run protection and Iomega HotBurn CD creation software for CD creation in less than four minutes.

- Win/Mac.

Websearch Code 213073
$185

Wacom Graphire3

The Graphire3 refines the concept of working with graphics and drawing, signing documents and photo/video editing applications. It is designed for the entry level user but is also ideal for the digital photographer, budding videographer and computer graphics enthusiast. The Graphire3 comes with Wacom's renowned pressure-sensitive pen technology with 512 levels of pressure sensitivity and 2032 Lines Per Inch resolution. Cordless and batteryless in nature makes you carefree at work! The pressure sensitive eraser allows you to 'rub out' in drawing/painting, as well as delete text in applications such as Microsoft Word and Excel.

- 4x5 tablet available in Pink, Silver or Metallic Blue

Included Software

- Ulead Photo Express SE V4
- Procreate Painter Classic
- PenPlus Personal
- Win/Mac

4x5 Silver
Websearch Code 209840
$122

6x8
Websearch Code 209748
$215

Wacom Cintiq 15x

The Cintiq 15x is a versatile tool for enhancing creative control, maximizing productivity, and communicating ideas in a natural and comfortable way. It features a compact design, clear LCD display, direct pen-on-screen control, wide viewing angle and adjustable stand.

- Win/Mac

Websearch Code 214039
$3449

Wacom Intuos2

The Intuos2 professional graphics tablet is the latest step forward in the evolution of state-of-the-art input devices for graphics professionals and digital photographers. Wacom's Intuos2 Grip Pen feature 1024 levels of tip and eraser pressure, tilt, angle and direction, and two side buttons that act as modifier keys, keystrokes, or mouse buttons. As with all Intuos2 tools, the pen's functionality is completely customizable through Wacom's Control Panel software. The 9x12, 12x12 and 12x18 sizes feature dual track where you can use two accessories on the tablet at the same time and quick point areas for fast navigation.
Intuos2 tablets come in a variety of colours.

Included Software

- PainterClassic
- Adobe Photoshop Elements 2. (for 4x5, 6x8 and 9x12 sizes)
- ComicStudio mini
- Win/Mac

- **6x8 (no software)** (212007) **$359**
- **9x12 Ice Blue** (190483) **$641**
- **9x12 (no software)** (213079) **$535**

4x5 Ice Blue
Websearch Code 189278
$292

6x8 Ice Blue
Websearch Code 189516
$449

Wacom Cintiq 18SX

The Cintiq 18SX is an 18 inch Large Format SXGA Interactive Pen Display, equipped with the highest standard TFT LCD panel. Having an easy fitting rubber grip and a fast response rate, Cintiq's pressure-sensitive Grip Pen will give you exact control and smoothness to your creative work. The original rotational feature and inclination display stand, enables everybody to work their own natural way or style.

- Win/Mac

Websearch Code 214040
$6299

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Call 1300 300 003 or visit www.iswit.com.au as prices may change due to daily fluctuations and online discounts.

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Belkin SurgeMaster

A power surge or lightning strike can destroy your electronic equipment in an instant. The SurgeMaster range offers the best protection for all your sensitive electronic devices in your home or office. No amount of thunder and lightning will ever be able to scare away your protection. Be safe and smart; choose a SurgeMaster with telephone/data line protection and if you want to protect your AV equipment with coaxial connection, choose the surge protector that protects both.

- **Belkin 4 Way Telephone Pro** (BEL176) **$46**
- **Belkin 6 Way Telephone Pro** (194724) **$95**
- **Belkin 6 Way Telephone Pro + AV** (BEL182) **$109**
- **Belkin 8 Way Telephone Pro** (190488) **$115**
- **Belkin 8 Way Telephone Pro + AV** (190655) **$129**

Belkin BulldogT Universal Security Kit

Strong, durable theft deterrent system. Safeguard computers and home office electronic equipment with high-tension steel anchoring palettes, aircraft quality steel cable, heavy duty steel lock, super adhesive. Complete with aircraft-quality cable, lock, 2 keys, heavy-duty steel plates and cyanoacrylate adhesive. $500 Anti-Theft Warranty.

$66
Websearch Code 214612

Belkin Mini-Wireless Optical Mouse

Perfect for the mobile professional. Take it on the road and use it's optical precision on virtually any surface - anywhere you use your laptop. Works on your notebook computer from as far as 3 feet away.

$59
Websearch Code 196099

Belkin ErgoFit Wireless Optical Mouse

The ErgoFit Wireless Optical Mouse from Belkin is designed to release you from the mess of long, tangled mouse cords, it lets you enter information to your computer from up to six feet away, with smooth, digital accuracy. Five customizable buttons and high-end software. ErgoFit delivers smooth, superior unctionality using dual-channel, random IDs that help eliminate interference from other wireless devices.

$55
Websearch Code 214622

Belkin Wireless Keyboard & Optical Mouse

Uses digital radio technology to give you the luxury of using your keyboard and mouse anywhere within six feet of the receiver. No more cables to clutter your desktop. The mouse uses optical technology to deliver accurate signals from smooth, easy movements. Access the Internet and favorite applications using the seven multimedia keys and seven hot keys.

Belkin Classic keyboard and mouse (208863)
$44

$68
Websearch Code 208862

Belkin Tunecast II

Now you can use your iPod device, PDA, MP3, CD, cassette player, PC, or laptop to listen to your favorite tunes through any FM stereo receiver. The Belkin TuneCast II Mobile FM Transmitter connects portable music players to your car or home stereo quickly and easily using FM radio waves.

$55
Websearch Code 214401

Belkin Universal UPS

The 800VA Offers protection for your computer against surges, spikes, blackouts and lightning stikes. It features serial and USB Ports, 4 battery backup sockets with surge protection, a $150,000 connected equipment and data recovery warranty. When the power goes off the computer stays on! Also available in 1000va & 1200va models.

$465
Websearch Code 208896

Belkin Hi- Speed USB 2.0 DockStation

The Hi-Speed USB 2.0 DockStation lets you use just two cables to connect parallel, serial, VGA, Ethernet and USB 2.0 devices to your notebook. Provides two USB 2.0 ports, one parallel port, one 10Base-T/100Base-T Ethernet port, one VGA pass-through port for connecting your monitor, and one RS232 serial port.

$128
Websearch Code 212917

Belkin 4Port Mini Mobile Hub

The USB 4-Port Micro Hub from Belkin lets you connect up to four USB devices with easy, Plug-and-Play functionality-virtually anywhere you take your laptop. With USB connectivity, you get fast, reliable data transfers for a variety of devices. Its compact size and advanced functionality makes it the ideal accessory to include inside your laptop case-a great solution for today's mobile professional.

$29
Websearch Code 214613

Belkin 2-Port KVM Switch with built in cabling

Control two computers using one monitor, PS/2 keyboard and mouse. Hot key functionality allows you to switch ports easily through simple keyboard commands. Supports high video resolution of up to 2048x1536@65Hz through built-in coaxial VGA cabling.

$71
Websearch Code 208861

Belkin Wireless 802.11g Router & Network Card Bundle

The Belkin 802.11g Wireless Kit lets users share files and a broadband Internet connection among their computers-without using networking cables. 802.11g technology provides you with networking speeds nearly five times faster than the current Wi-Fi (802.11b) standard.

Desktop PC Bundle
$289
WebsearcCode.....214615

Notebook Bundle
$289
WebsearcCode.....214614

Belkin Wireless Network Cards

The Belkin 802.11b Wireless Desktop PCI Network Card implements wireless networking into desktop PCs with a quick installation. Placing the PCI card into any available PCI expansion slot is all it takes to enable wireless networking capabilities in your desktop.

Desktop PCI Card
$44
WebsearcCode.....195608

Notebook PCMCIA Card
$44
WebsearcCode.....189457

Belkin Wireless Cable/ADSL Router (4 port)

The 802.11b Wireless Cable/DSL Gateway Router uses the 802.11b wireless Ethernet standard to let you share a broadband Internet connection among your computers-without cables. Features an integrated 4-port 10/100Base-T Ethernet switch that allows you to connect wired computers for all the advantages of networking.

$152
Websearch Code 207094

Computer Products at Rock Bottom Prices

LiteOn Internal 52/32/52 CDRW Kit

The LiteOn CDRW Drive includes Smartburn technology that automatically checks media quality and sets limit on burning speed to ensure successful writing sessions. The IDE drive can be installed either vertically or horizontally, has buffer underrun prevention and also a vibration absorber mechanism.

$57
Webcsearch Code 211216

LiteOn Internal Combo Drive

This drive offers the best of both worlds. Not only does this drive offer 48x/24x/48x burn speeds for CD's, it allows the user to play DVD's. With innovated SMART-X technology that supports high speed digital audio extraction and high speed VCD data extraction, this drive is not only error free but fast.

$95
Webcsearch Code 209431

LiteOn 16x DVD-ROM Drive

- 16X DVD-ROM & 48X CD-ROM with Pure-CAV technology
- SMART-X technology supports high speed digital audio and VCD extraction
- High speed DVD/CD playback technology to improve playability
- Easy-tray design for both horizontally & vertically use
- Gear-driven tray loading mechanism to improve reliability

$53
Webcsearch Code 189265

LaCie DVD-R/RW 8x

Burns DVD-R & DVD-RW at 8x, CDR at 24x and CDRW at 16x

This universal drive delivers four DVD formats in a single slim device. By combining DVD+RW and DVD-RW formats, the LaCie Dual DVD Drive delivers greater creative versatility by eliminating the need to choose one format over another. This combination drive is also capable of writing to most CD and DVD formats, which are compatible with nearly all existing DVD-Video players.

Create original video DVDs

Record professional-quality, personalised DVDs with your laCie Dual DVD drive and the included Sonic MyDVD Video Suite authoring software. Import video and audio footage from your DV camcorder, arrange your sequences and burn projects onto DVD or CD-Video discs. Completed DVDs can then be played back on virtually any DVD player to share among family and friends. Features FireWire and USB 2.0 ports for easy connection to any Mac or PC.

Firewire/USB
Websearch WIN/MAC ..214745 $399

Internal
Websearch WIN 214766 $269

LaCie Pocket Hard Disks

Designed for people on the move, the LaCie Pocket Drive is small enough to fit into your pocket and features a special silicone bumper and sturdy casing for proven shock protection. Extremely small, hot-plug, self-powered, cross-platform, noiseless, sturdy... LaCie Pocket Drive features also the best reliability and performances: up to 80GB in your pocket and 35MB/s speed! Using LaCie's unique U&I technology, the Pocket Drive incorporates both USB and FireWire connectors, allowing you to hot-swap it from one computer to another without rebooting.

- Hi-Speed USB 2.0 and FireWire
- Hot-Plug Mac & Windows
- Shock-Resistant design
- **20GB Pocket HD (202153) $314**
- **60GB Pocket HD (193902) $499**
- **80GB Pocket HD (207043) $652**

40GB
Websearch Code 189723 $399

LaCie d2 External Hard Disks

LaCie d2 range is a professional flexible system. Made of extruded aluminium and 2amac alloy, which are the same materials used in Formula 1 cars design for their unique features: robust, lightweight and fast cooling. Kensington cable lock and power lock for better security. Front power button and blue activity led, switches on/off with your computer. Supplied with drivers for Mac and PC. Drives can be used stacked horizontally or can be mounted in a 1U 19" rack (kit sold separately).

160GB USB2.0 & Firewire & F800 (212984) $415

200GB USB2.0 & Firewire & F800 (202160) $483

250GB USB2.0 & Firewire & F800 (202161) $543

400GB BD USB2.0 & Firewire & F800 (196237) $899

500GB BD USB2.0 & Firewire & F800 (196238) $1035

1000GB USB2.0 & Firewire & F800 (214528) $1949

*F800 is a new FireWire interface doubling transfer rate -up to 100MB/s- of current FireWire interface. Requires specific F800 card to take advantage of the performance.

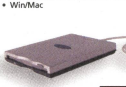
LaCie Multi Card Reader

- Supports six types of media
- Plug and play convenience
- Compact design with versatile USB connectivity.
- An essential tool for digital photographers and marketing departments.
- Simple setup and convenient USB interface make it ideal for viewing images on a variety of digital media in both Mac and PC environments.
- Win/Mac

Websearch Code 196043 $39

LaCie Floppy Disk Drive

- Offers an ultra-thin, portable design to provide complete mobility, allowing you to move freely and take your data with you wherever you go
- Simple setup without terminators or device IDs
- Ideal for additional storage, archiving, data shuttle, and cross-platform data exchange
- Win/Mac



Websearch Code 193803 $75

LaCie CDRW 52x USB2

"design by F.A.Porsche"

A simple way to burn pictures, songs or video footage onto personal CDs. With crisp edges and a reflective finish, the LaCie CD-RW Drive will add a stylish element to your desktop.

- **FireWire (213180) $188**

USB2.0 Win
Websearch Code 213178 $165

LaCie Mobile drive USB2

"design by F.A.Porsche"

Specially designed for getting your files from point A to point B. Made with a durable exterior to withstand life on the go, this portable drive lets you safely travel with up to 80GB of personal information, including MP3s, audio tracks and photos.

- **Mobile 20GB USB2.0 (213901) $253**
- **Mobile 40GB USB2.0 (213902) $340**
- **Firewire Available**

80GB
Websearch Code 213903 $617

LaCie Drive USB2

"design by F.A.Porsche"

State-of-the-art design and awesome performance, with room to store up to 250GB. Built to be lightweight and durable, these drives can be easily moved for sharing and exchanging of files.

- **40GB USB2.0 (213907) $190**
- **80GB USB2.0 (213908) $237**
- **160GB USB2.0 (213909) $356**

250GB
Websearch Code 213918 $474

LaCie Security Lock

- Protect your equipment (D2 as well as laptop) from theft and damage
- Install in just a few seconds
- Cable is resistant against cutting and pull up
- Lock cannot be forced, delivered with two numbered keys

Websearch Code 195419 $39

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Call 1300 300 003 or visit: www.ioerh.com.au as prices may change due to daily fluctuations and online discounts.

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Pioneer A07 8xDVD-R, 8xDVD+R, DVD-R/+R 8x, DVD-RW/+RW 4x

The Pioneer A07 is the world's first 8x8 dual format writer. This means it's capable of writing at 8x speed on DVD-R and also DVD+R discs. The new drive also records high-speed DVD-RW and +RW discs at up to 4x speed and CD-R and CD-RW discs at up to 24x speed.

Features:

- Unique new design front (available in beige or black)
- Honeycomb chassis for super-quiet & smooth operation
- Performance Adjusting Firmware
- Quality Ulead software
- Dolby AC-3 audio encoder
- Media included (1 x 8X DVD-R, 1 x 4X DVD-RW)
- DVD-R, DVD-RW, DVD+R, DVD+RW, CD-R, CD-RW
- DVD-R 8x*, DVD-RW 4x*
- DVD+R 8x, DVD+RW 4x
- CD-R 24x, CD-RW 24x

*Requires certified media

NOW Writes 8x Speed DVDs

Beige DVR-A07XLA
Websearch Code 214696
$289

Black DVR-A07XLB
Websearch Code 214703
$289

Pioneer PIODVRS606P 4xDVD-R, 2xDVD-RW, 4xDVD+R, 2.4xDVD+RW External Drive
Pioneer PIODVRSK12DP 2xDVD-R, 2xDVD-RW, 2.4xDVD+R, 2.4xDVD+RW Slimline Drive

External Bundles

- USB 2.0 and IEEE1394 Interface, leads included
- Supports "buffer under run" protection
- Slimline external ideal for notebook and mobile users
- Vertical and horizontal mounting stands included
- Quality Ulead Software including VideoStudio 7.0 SE DVD Picture Show SE

Writes DVD + & - Formats

Includes 1pce 4 x DVD-R media, and 1pce 2x DVD-RW media

Slimline DVR-SK12DP
Websearch Code 211131
$515

DVR-S606
Websearch Code 212489
$459

Maxtor OneTouch Personal Storage

It's not just data, it's your life. Save it. Store it. Back it up with the push of a button.

Just press the button and your files are backed up in one simple step. It's simply the faster backup. Faster than CD. Faster than a floppy. Faster than removable cartridge systems. Need storage? We're talking huge amounts—up to 300GB. Space for your photos, videos, graphics, music, documents and more. Spend less time searching for files by storing them on a single, spacious drive.

The drive, with its high quality, anodized aluminum case, is as attractive as it is flexible. It's great for home or office. It lies flat on your desk or stands upright to save space. It connects to FireWire or USB ports on a PC or Mac. It backs up with the Maxtor OneTouch button or runs automated backups using the included software, Dantz Retrospect Express. And you can customize the button to launch any application.

120GB - Perfect for home or office

The Maxtor Personal Storage external hard drive quickly adds storage and organisational space through your computer's USB port.

200/250GB - Perfect for video editing and high-end graphics

The Maxtor 7200RPM hard drive featuring both FireWire (IEEE1394, iLINK) and USB 2.0 interface ports for your PC and Mac.

300GB - Perfect for storage hungry files

The Maxtor 300GB hard drive provides you with enough capacity to hold and organise your storage-hungry applications and files.

Features

- Patent-pending Maxtor OneTouch technology
- Plug and play storage
- Hot-swappable
- Anodized aluminum design
- Stands vertically or horizontally
- Customisable Maxtor OneTouch button
- Power management and on/off switch
- Whisper-quiet FDB motor
- Mac formatted (for Mac)
- Connect additional drives

120GB
Websearch Code 211128
$289

200GB
Websearch Code 211129
$449

250GB Mac
Websearch Code 211398
$549

250GB Win
Websearch Code 211130
$549

300GB
Websearch Code 211145
$615

Sony Portable 24/8/24/8X Combo Drive & Audio Kit

This product combines a CDRW Drive and DVD Rom Drive, FlashMemory Reader and Portable Audio Device in one. When connected to a computer it burns CD's, reads & writes to a MemoryStick, plays CD and DVD disks as a stand-alone it plays Audio CD's, MP3 & WAV files. Win and Mac.

$458
Websearch Code 194706

Sony Internal 52/32/52X CD-RW Kit

Features 52X recording and playback. Incorporates new Ultra-Speed Rewriting support, buffer under-run protection, and a unique dual speed operation. Designed for Desktop or Tower PC, comes with an interface cable and mounting screws.

- **Sony Internal 52x32x52x with Roxio CD Creator 5 OEM software (210991)** $67
- **Sony Internal 52x32x52x with Nero 5 OEM software (210990)** $72

$60
Websearch Code 210390

Sony External 24x8x24x8x USB CD-RW Burner

This pocket sized combo drive is one of the smallest in the market. Burn & play CD's, plays DVD's and also acts as a Flash-Memory reader. For use with a USB equipped Laptop or Desktop computer it comes complete with Windows & Macintosh software.
Bundled for a limited time with Sony 10 Pack 48x 700MB CD-Rs (Jewel Case).

$336
Websearch Code 210051

Computer Products at Rock Bottom Prices

Syscan TravelScan 860

The TravelScan 860 is a business card scanner which interfaces to any standard USB port. It is bundled with Syscan BCR business card software providing first-class business card recognition and ease of use.

Automatically perform text recognition of the card (OCR) and save both the text and the image.

$245

Websearch Code 190180

Syscan TravelScan 464

At only 335 grams, the TravelScan 464 seems like a light weight but it packs plenty of punch. It features USB2 interface, 600 optical resolution and the versatile PageManager 6 document management software. Scan an A4 page in as little as 25 seconds. Free from clumsy power adaptors: plugs straight into your PC's USB port.

$299

Websearch Code 195856

Fujistu Fi-4120CU scanner

Designed to occupy minimal desk space, the Fujitsu Fi-4120CU document scanner features true duplex colour scanning, both sides of a document being scanned at the same time in a single pass. It also boasts an impressive 25ppm scanning speed, 50 page automatic-feeder capacity and both USB & SCSI ports.

HOT PRICE!

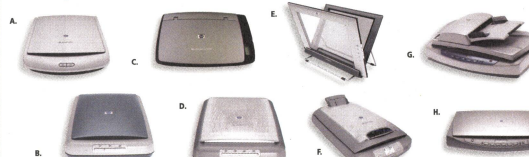
$1235

Websearch Code 207418

Canon CanoScan Scanners

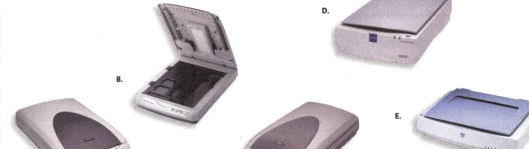
	Websearch	Product Description	Resolution	Connectivity	Platform	Price
A.	CAN310	Canon CanoScan N646U/EX Scanner	600 x 1200 dpi	USB	Win/Mac	$88
B.	195688	Canon CanoScan LiDE 20 Scanner	600 x 1200 dpi	USB	Win/Mac	$115
C.	195876	Canon CanoScan LiDE 30 Scanner	1200 x 2400 dpi	USB2	Win/Mac	$149
D.	195877	Canon CanoScan LiDE 50 Scanner	1200 x 2400 dpi	USB2	Win/Mac	$189
E.	211992	Canon CanoScan CS3200F Scanner	1200 x 2400 dpi	USB	Win/Mac	$229
F.	194995	Canon CanoScan 5000F Scanner with Transparency Adaptor	2400 x 4800 dpi	USB2	Win/Mac	$308
G.	209576	Canon CanoScan LiDE 80 Scanner	2400 x 4800 dpi	USB2	Win/Mac	$339
H.	195547	Canon CanoScan 8000F Scanner with Transparency Adaptor	2400 x 4800 dpi	USB2	Win/Mac	$339
I.	195879	Canon CanoScan 9900F Scanner with Transparency Adaptor	3200 x 6400 dpi	USB2/Firewire	Win/Mac	$599

HP Scanjet Scanners



	Websearch	Product Description	Resolution	Connectivity	Platform	Price
A.	208636	HP Scanjet 2400c Scanner	1200 x 1200 dpi	USB	Win/Mac	$129
B.	208637	HP Scanjet 3670c Scanner with Transparency Adaptor	1200 x 1200 dpi	USB	Win/Mac	$215
C.	196263	HP Photosmart 1200 Photo Scanner **(Portable)**	1200 x 1200 dpi	USB	Win/Mac	$215
D.	208635	HP Scanjet 3970c Scanner with Transparency Adaptor	2400 x 2400 dpi	USB	Win/Mac	$344
E.	212025	HP Scanjet 4670 Scanner	2400 x 2400 dpi	USB	Win/Mac	$430
F.	211910	HP Scanjet 5530 Scanner	2400 x 4800 dpi	USB	Win/Mac	$516
G.	191415	HP Scanjet 5550c Scanner 35pg Auto Doc Feeder	2400 x 2400 dpi	USB2	Win/Mac	$861
H.	207761	HP Scanjet 8200c Scanner with Transparency Adaptor	4800 x 4800 dpi	USB/SCSI Opt	Win/Mac	$966

Epson Perfection/Expression Scanners



	Websearch	Product Description	Resolution	Connectivity	Platform	Price
A.	208227	Epson Perfection 1670 Scanner	1600 x 3200 dpi	USB	Win/Mac	$208
B.	208228	Epson Perfection 1670 Photo Scanner with Transparency Adaptor	1600 x 3200 dpi	USB	Win/Mac	$254
C.	209805	Epson Pefefection 3170 Photo Scanner with Transparency Adaptor	3200 x 6400 dpi	USB2	Win/Mac	$583
D.	EPS457	Epson Expression 1680 Scanner	1600 x 3200 dpi	USB/SCSI	Win/Mac	$1912
E.	197343	Epson Expression 1640XL Scanner **(A3)**	1600 x 3200 dpi	USB/SCSI	Win/Mac	$5187

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Logitech X-120 Speakers

- Bass port delivers full, rich sound
- Volume, power, and treble/bass controls offer user-friendly convenience
- Headphone jack lets you listen privately
- Internal power supply means no dealing with bulky wall adapters

Websearch Code 202564 **$45**

Logitech X-220 Speakers

You'll hear the difference immediately: from the deep bass to the smooth mid-range to the clear highs. Feature wrap-around grilles and rotating stands for easy wall-mounting and controls for power and volume and a headphone jack for private listening are right at your fingertips.

Websearch Code 214117 **$65**

Logitech X-620 Speakers

- Immerse yourself in sound with the subwoofer and six satellite speakers
- Hear the action behind you for greater gaming intensity with rear center channel
- Enjoy twice the bass of conventional designs with our patented subwoofer
- Place the satellites on a shelf or mount them to a wall

Websearch Code 210759 **$140**

Logitech Z-3 Speakers

- Featuring brushed aluminium, wood grain styling, removable grilles, and cast metal stands.
- Conveniently control volume and power with the equally elegant wired remote, which also features a headphone jack for private listening.
- Enjoy the full, rich bass from the patented pressure driver subwoofer, complete with its own volume control.

Websearch Code 210768 **$147**

Logitech Z-5300 Speakers

With five satellite speakers and subwoofer immerse yourself in sound. Coming complete with a remote control with a LCD screen and an adapter to hook up your games console. Change your music experience today.

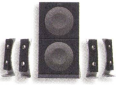
Websearch Code 210770 **$279**

Logitech Z-680 Speakers

Gives you THX-certified theatre quality digital sound through optical and coaxial inputs for simple connection to nearly any audio appliance. The 5.1 configuration with Dolby Digital and DTS Decoding pumps bass through the 188-watt subwoofer and with each of the four satellites providing 62 watts (RMS) and a 69-watt centre channel you have crystal-clear midrange and high notes.

Websearch Code 194855 **$477**

Altec Lansing Speakers



	Websearch	Product Description	No. Speakers	RMS (Watts)	Price
A.	195282	Altec Lansing AVS200 Speaker	2	3	$33
B.	190463	Altec Lansing 220 Speaker	2	10	$44
C.	195283	Altec Lansing AVS300 Speaker	3	17	$55
D.	190464	Altec Lansing 221 Speaker	3	20	$88
E.	190467	Altec Lansing 2100 Speaker	3	35	$149
F.	196832	Altec Lansing 621 Speaker	3	143	$239
G.	190468	Altec Lansing 4100 Speaker	5	107	$325
H.	193216	Altec Lansing 251 Speaker	6	45	$187
I.	196831	Altec Lansing XA3051 Speaker	6	56	$349

Sony DVD Player CD-RW MP3 Player (DVPNS530B)

Black CD-R/RW & MP3-CD Playback Precision Drive 2 Twin Laser DynamicTilt Comp 27mhz/24 Bit Video Dac 192khz/24 Bit Audio Dac Component Video Output

$211

Websearch Code 204013

Sony 51cm BM Series FD Trinitron Wega TV (KVBM21M10)

- New Top Control Panel
- New Graphic On Screen Display Menu
- Intelligent Picture
- Adjustable Colour Temperature – Cool, Standard, Warm

$478

Websearch Code 213284

Sony 76cm Widescreen FD Trinitron Wega TV (KV32LS65AS)

- 100Hz Digital Plus
- Analogue Tuner
- 3 Picture Modes: Live, Movie, Personal
- 5 Aspect Ratio Modes: Zoom, Wide, 4x3, 14:9, Smart

$2690

Websearch Code 213285

Sony 6 Head Hifi Video Recorder (SLVEZ735)

- SP/LP Playback
- One Touch timer
- Index Function
- NTSC Playback on PAL TV
- Auto Head Cleaner

$288

Websearch Code 207097

Computer Products at Rock Bottom Prices

Seagate Barracuda Hard Drives

- 7200 RPM desktop performance
- 350 Gs nonoperating shock. Protect drive from shock and vibration
- DiscWizard software
- SoftSonic FDB Motor
- 2-Mbyte cache buffer

- **40GB** (189720) **$115**
- **120GB** (194590) **$159**
- **160GB** (208071) **$185**

80GB

$119

Websearch Code.....198582

Maxtor Hard Drives

ATA-133 7200RPM 8mb Cache

The solution for performance PCs with data intensive applications such as network attached storage, home networking devices, audio, video and other multimedia applications.

- **120GB** (211201) **$160**
- **160GB** (211202) **$199**
- **200GB** (211199) **$269**
- **250GB** (214287) **$375**

80GB

$125

Websearch Code.....211200

Century CD Storage

Century CD is the industry's first affordable, intelligent CD and DVD storage unit, providing the user with a 100 disk capacity per unit. Manages up to 127,000 disks from a single interface on your PC.

$88

Websearch Code.....207589

Canon Video Cameras

	Webseartch	Description	CCD	Zoom (Optical)	Digital Zoom	LCD Colour Screen	Storage	Connection	Weight	Price
A.	196665	Canon MV600i MiniDV	400K	18x	360x	2.5 inch	Tape	Firewire	520g	$818
B.	196628	Canon MV630i MiniDV	400K	20x	400x	2.5 inch	MMC & SD	USB/IEEE1394	520g	$985
C.	214278	Canon MV650i MiniDV	400K	22x	440x	2.5 inch	MMC & SD	USB/IEEE1394	525g	$1267
D.	207074	Canon MV6iMC MiniDV	420K	10x	400x	2.0 inch	MMC & SD	USB/IEEE1394	380g	$1319
E.	214279	Canon MVX150i MiniDV	850K	16x	320x	3.5 inch	MMC & SD	USB/IEEE1394	620g	$1545
F.	210669	Canon MVX10i MiniDV	2000K	10x	200x	2.5inch	MMC & SD	USB/IEEE1394	450g	$1868
G.	210670	Canon MVX3i MiniDV	2000K	10x	200x	3.5inch	MMC & SD	USB/IEEE1394	725g	$2115

Sony Video Cameras

	Webseartch	Description	CCD	Zoom (Optical)	Digital Zoom	LCD Colour Screen	Storage	Connection	Weight	Price
A.	204063	Sony DCRTRV19 MiniDV	400K	10x	120x	2.5 inch	Tape	USB/IEEE1394	520g	$963
B.	204064	Sony DCRTRV22 MiniDV	400K	10x	120x	2.5 inch	Memory Stick	USB/IEEE1394	530g	$1099
C.	212373	Sony DCRTRV33 MiniDV	690K	10x	120x	2.5 inch	Memory Stick	USB/IEEE1394	540g	$1425
D.	209067	Sony DCRPC104 and DSCU305	690K	10x	120x	2.5 inch	Tape	USB/IEEE1394	440g	$1662
E.	213898	Sony DCRDVD100 DVD	400k	10x	120x	2.5 inch	DVD	USB	640g	$1814
F.	210573	Sony DCRIP1 MicroMV	690K	10x	120x	2 inch	Memory Stick	USB/IEEE1394	230g	$2352
G.	195357	Sony DCRIP55 MicroMV	690K	10x	120x	2.5 inch	Memory Stick	Bluetooth	435g	$2534

Secure Digital Cards

Webseartch	Description	Price
211594	Sandisk 64MB Secure Digital Card	$44
211595	Sandisk 128MB Secure Digital Card	$77
211596	Sandisk 256MB Secure Digital Card	$135
211597	Sandisk 512MB Secure Digital Card	$295
214386	Sandisk 1GB Secure Digital Card	$659
208415	Kodak 64MB Secure Digital Card	$61
208408	Kodak 128MB Secure Digital Card	$112
208409	Kodak 256MB Secure Digital Card	$144

CompactFlash Cards

Webseartch	Description	Price
211537	Sandisk 64MB CompactFlash Card	$33
211538	Sandisk 128MB CompactFlash Card	$53
211539	Sandisk 256MB CompactFlash Card	$95
211540	Sandisk 512MB CompactFlash Card	$185
214223	Sandisk 1GB CompactFlash Card	$399
211542	Sandisk 2GB CompactFlash Card	$795
208410	Kodak 64MB CompactFlash Card	$49
208413	Kodak 128MB CompactFlash Card	$65
208411	Kodak 256MB CompactFlash Card	$128

Memory Sticks

Webseartch	Description	Price
211599	Sandisk 64MB Memory Stick	$65
211600	Sandisk 128MB Memory Stick	$83
211601	Sandisk 256MB Memory Stick	$149
211602	Sandisk 256MB Memory Stick Pro	$149
211607	Sandisk 512MB Memory Stick Pro	$299
211604	Sandisk 1GB Memory Stick Pro	$685
214388	Sandisk 2GB Memory Stick Pro	$1333
SONY83	Sony 32MB Memory Stick	$49
SONY84	Sony 64MB Memory Stick	$68
191855	Sony 128MB Memory Stick	$101
203998	Sony 256MB Memory Stick Pro	$169
203999	Sony 512MB Memory Stick Pro	$427
204000	Sony 1GB Memory Stick Pro	$860

xD Picture Cards

Webseartch	Description	Price
214382	Sandisk 64MB xD Picture Card	$39
214383	Sandisk 128MB xD Picture Card	$77
214384	Sandisk 256MB xD Picture Card	$188
214030	Sandisk 512MB xD Picture Card	$299
209275	Olympus 32MB xD Picture Card	$33
208029	Olympus 64MB xD Picture Card	$59
208343	Olympus 128MB xD Picture Card	$115
197508	Olympus 256MB xD Picture Card	$229
209984	Olympus 512MB xD Picture Card	$385

Smart Media Cards

Webseartch	Description	Price
211588	Sandisk 64MB Smart Media Card	$33
205225	Sandisk 128MB Smart Media Card	$62

MultiMedia Picture Cards

Webseartch	Description	Price
211590	Sandisk 32MB MultiMedia Picture Card	$29
211591	Sandisk 64MB MultiMedia Picture Card	$44
211592	Sandisk 128MB MultiMedia Picture Card	$79

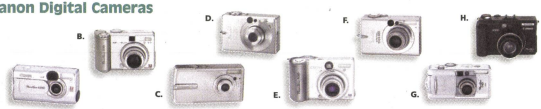
CAN THE DEAL GET BETTER? Call 1300 300 003 or visit: www.mwh.com.au as prices may change due to daily fluctuations and online discounts.

VISA MasterCard BANKCARD AMERICAN EXPRESS DINERS CLUB RENTSMART

Check out www.iswh.com.au for the hot new Olympus Digital range

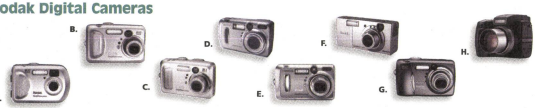
Out mid March!

Canon Digital Cameras



	Websearch	Product Description	Megapixels	Optical Zoom	Price
A.	196664	Canon PowerShot A300 Digital Camera	3.2	No	$275
B.	196838	Canon PowerShot A70 Digital Camera	3.2	3x	$489
C.	214304	Canon PowerShot IXUS I Digital Camera	4	No	$529
D.	196902	Canon PowerShot IXUS II Digital Camera	3.2	2x	$539
E.	210739	Canon Powershot A80 Digital Camera	4	3x	$575
F.	196153	Canon PowerShot IXUS 400 Digital Camera	4	3x	$739
G.	195970	Canon PowerShot S50 Digital Camera	5	3x	$925
H.	197557	Canon PowerShot G5 Digital Camera	5	4x	$995

Kodak Digital Cameras



	Websearch	Product Description	Megapixels	Optical Zoom	Price
A.	208860	Kodak CX6200 Digital Camera	2	No	$189
B.	209612	Kodak CX6230 Digital Camera	2	3x	$268
C.	202127	Kodak CX6330 Digital Camera	3.1	3x	$375
D.	197565	Kodak DX6340 Digital Camera	3.1	4x	$459
E.	210835	Kodak DX6440 Digital Camera	4	4x	$569
F.	197040	Kodak LS633 Digital Camera	3.3	3x	$545
G.	209121	Kodak DX4530 Digital Camera	5	3x	$569
H.	214166	Kodak DX6490 Digital Camera	4	10x	$960

Sony Digital Cameras

	Websearch	Product Description	Megapixels	Optical Zoom	Price
A.	195421	Sony DSCP32 Cybershot Digital Camera	3.2	No	$334
B.	195422	Sony DSCP52 Cybershot Digital Camera	3.2	2x	$425
C.	195423	Sony DSCP72 Cybershot Digital Camera	3.2	3x	$485
D.	207228	Sony DSCU60 Cybershot Digital Camera	2	No	$438
E.	211281	Sony DSCU50 Cybershot Digital Camera	2	No	$525
F.	196332	Sony DSCP85 Cybershot Digital Camera	3.2	3x	$588
G.	196333	Sony DSCP92 Cybershot Digital Camera	5	3x	$669
H.	196330	Sony DSCP10 Cybershot Digital Camera	5	3x	$802
I.	196858	Sony DSCFX77 Cybershot Digital Camera	4	No	$844
J.	211979	Sony DSCT1 Cybershot Digital Camera	5	3x	$929
K.	196373	Sony DSCV1 Cybershot Digital Camera	5	4x	$1038
L.	196327	Sony DSCF717 Cybershot Digital Camera	5	5x	$1247
M.	211563	Sony DSCF828 Cybershot Digital Camera	8	7x	$2161

Canon i475D Photo Printer

- 4800 x 1200 dpi for high resolution photo printing
- True borderless photo printing on A4, 6"x4" or 5"x7" media
- Direct photo printing from any compatible digital camera or memory card - no computer required
- Microscopic 2 picolitre ink droplets to eliminate graininess.

Win/Mac

$239

Websearch Code 211986

Canon Photo Paper

A4 Glossy Photo Plus 270gsm
20 Sheets (196195) **$20**

4x6" Glossy Photo Plus 270gsm
20 Sheets (196190) **$10**

A4 Matte Photo 170gsm
50 Sheets (196194) **$16**

5x7" Glossy Photo Plus 270gsm for borderless Bubblejets
20 Sheets (211892) **$14**

HP Photosmart 145 Printer

- 4800 x 1200 dpi for high resolution photo printing
- Professional-looking results with borderless prints
- Print from compatible digital camera memory cards with no computer.

Win/Mac

$259

Websearch Code 210215

HP Photo Paper

4x6" Glossy Photo Paper 175gsm
20sheets (210658) **$8.50**

4x6" Colourfast Glossy Photo Paper 280gsm
20sheets (207743) **$14**

5x7" Colourfast Photo Paper 240gsm
20sheets (193528) **$15**

A4 Glossy Photo Paper 175gsm
20sheets (210543) **$15**

A4 Colourfast Photo Paper 280gsm
20sheets (193527) **$26**

Computer Products at Rock Bottom Prices

APC Back-UPS ES 350/500 VA USB

Provides continued uptime and hardware protection for home or office users. Contains five Australian style outlets, phone, modem, fax and DSL data line surge protection, computer interface port for USB communications.

- **500 VA USB (212787) $220**

350 VA USB

$179

Websearch Code 189734

APC Back-Ups RS 800 VA

- Lightning and surge protection
- Internet Fax/Modem/DSL surge protection
- Resettable circuit breaker
- Building wiring fault indicator
- **APC Back-Ups RS 1000va (207121) $619**
- **APC Back-Ups RS 1500va (207122) $821**

$563

Websearch Code 212932

APC Surge Arrest Personal W/PH Protection

- Phone line protection
- 315 Joules Surge Energy Capacity.
- Child-safe outlets
- Protection Working Indicator - warns user if its circuitry is damaged
- **No line protection (195420) $45**

$59

Websearch Code APC837

APC Surge Protection for Notebooks

Offers compact AC, phone, modem line surge protection for the mobile professional.

- **2 Prong (197979) $49**

3 Prong

$49

Websearch Code 197980

Canopus Let's EDIT - Realtime Video Editing with Movie-style Effects

Canopus Let's EDIT is fast and easy-to-use video editing software with movie-style effects. Breakthrough realtime operation dramatically speeds up the editing process, as there is no rendering or waiting while creating movies with sophisticated special effects.

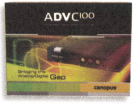
- Mix video clips
- Add titles, credits, pictures and captions
- Movie-style special effects
- Voiceover narration
- Publish interactive DVD movies

Let's EDIT RT and Let's EDIT RT+ are the world's only OHCI analogue and DV editing cards that are completely compatible with all widely used video equipment and hundreds of video editing applications. Together with Let's EDIT software these cards provide realtime render-free video output to ensure that there is no waiting or rendering required to playback, output and complete sophisticated video projects.

Let's EDIT	Let's EDIT RT	Let's EDIT RT+
Websearch Code 212666	Websearch Code 212667	Websearch Code 212668
$245	**$585**	**$779**

Canopus ADVC100

A realtime bidirectional analogue/DV converter featuring analogue inputs on the front and back, colour bar reference signal generator and automatic input signal detection. ADVC100 is the number 1 selling affordable, professional converter.



Websearch Code 212675 **$599**

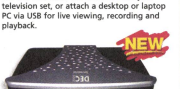
Canopus ADVC300

The ultimate bidirectional analogue to digital video converter unit for the video enthusiast. Featuring high-quality image enhancement technology including digital noise reduction and image stabilization using Line Time Base Correction, ADVC300 instantly cleans, stabilises and preserves old VHS and Hi8 videos in clean DV format.

Websearch Code 212680 **$989**

Hauppauge DEC2000T

The DEC2000T is a standard definition digital TV set top box with a difference - it has a USB port allowing capture of your favourite Digital TV programs to hard drive. You can use the DEC2000T stand-alone with your television set, or attach a desktop or laptop PC via USB for live viewing, recording and playback.



Websearch Code 212722 **$359**

Hauppauge Nova T

The Nova T is a standard definition (future HD upgradeable) Digital TV PCI tuner card. The Nova T offers the most incredible picture quality available on a PC tuner card. Digital TV programs can be viewed live, pause/timeshifted or recorded to hard drive in their full digital quality without any loss. These can then be archived to DVD.

Websearch Code 211250 **$259**

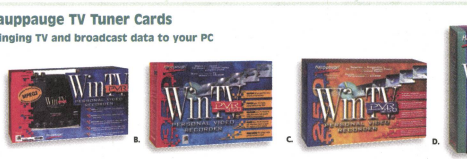
Hauppauge MediaMVP

Listen to and watch digital music, pictures and videos on your TV set, from your PC over your home Ethernet LAN! On-screen menus allow you to browse your PC from the comfort of your TV, and allows your PC/PVR system to be located anywhere in your home.

Websearch Code 211251 **$275**

Hauppauge TV Tuner Cards

Bringing TV and broadcast data to your PC



	Websearch	Product Description	Interface	Audio	FM Radio	HW MPEG Recorder	Remote Control	S-Video In	Video In	Audio In	Price
A.	195954	WinTV-PVR-350	PCI	DBX Stereo	Yes	Up to 12MBits/sec	Yes	Yes	Yes	Yes	$489
B.	195313	WinTV-PVR-250	PCI	DBX Stereo		Up to 12MBits/sec	Yes	Yes	Yes	Yes	$399
C.	HAU004	WinTV-USB	USB	Mono				Yes	Yes	Yes	$222
D.	211242	PVR-USB2	USB2	Stereo	Yes	Up to 12MBits/sec	Yes	Yes	Yes	Yes	$529

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Call 1300 300 003 or visit www.pwh.com.au as prices may change due to daily fluctuations and online discounts.

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Pinnacle Studio 9

Pinnacle Studio version 9 easily allows home editors the convenience of creating spectacular movies using numerous professional quality features with integrated CD/DVD burning capabilities. Pinnacle Studio version 9 provides image stabilisation, automated editing, automatic colour correction, noise removal, and surround sound, while maintaining total ease of use from start to finish.

- **Upgrade (214227) $119**
- **Academic (214233) $145**

$225

Websearch Code 214228

Pinnacle Studio 9 DV

Pinnacle Studio DV comes with a FireWire board that allows you to transfer videos from DV camcorder into your PC in order to create spectacular movies using powerful and creative functionalities such as image stabilization, automated editing, automatic colour correction, noise removal and surround sound, while maintaining total ease of use from start to finish.

- **Academic (214234) $195**

$345

Websearch Code 214230

Pinnacle Studio AV/DV 9

Pinnacle Studio AV/DV comes with an internal PCI board that allows you to transfer videos from any camcorder into your PC in order to create spectacular movies using powerful and creative functionalities such as image stabilisation, automated editing, automatic colour correction, noise removal and surround sound, while maintaining total ease of use from start to finish.

- **Academic (214236) $325**

$445

Websearch Code 214230

Logitech Stereo USB Headset

The Logitech Stereo USB Headset combines a noise-cancelling microphone and high-quality stereo headphones. Just plug in this headset to your USB port and get started immediately.

$48

Websearch Code 195942

Pinnacle Studio AV/DV Deluxe 9

The top-of-class solution inside the Studio line. The included break-out box allows easy and convenient desktop connection to any analogue and digital video sources, in order to capture, edit and export your videos. You can create spectacular movies, using powerful and creative functionalities and the richest collection of filters and effects.

- **Academic (214235) $445**

$575

Websearch Code 214229

Pinnacle Studio Moviebox DV 9

Pinnacle Studio MovieBox DV comes with a high-performance, ergonomic and aesthetic hub that connects to any PC's FireWire port in order to transfer digital or analogue video sources to your PC. The award winning Pinnacle Studio 9 software then allows you to make stunning movies that you can store and share on VHS, VCD and DVD.

- **Academic (214238) $515**

$629

Websearch Code 214232

Pinnacle Movie Box USB 9

With Pinnacle Studio MovieBox USB, home movie making has become accessible to everyone. Using the high-quality, stylish device, you can copy easily, any videos onto your PC. Use the included Pinnacle Studio version 9 editing software to create amazing home movies and archive them onto usual videotapes or store them on CDs & DVDs.

- **Academic (214237) $459**

$549

Websearch Code 214231

Logitech Premium Stereo Headset

The stereo headphones and noise-cancelling microphone deliver improved audio clarity. It features a convenient inline volume and mute control, and its microphone can be worn on either the right or left side.

$25

Websearch Code 202551

Pinnacle Show Centre

Enjoy your PC's digital movies, music and pictures on your TV and home stereo with Pinnacle ShowCenter. ShowCenter organises all of your PC media files, creates custom playlists, and then lets you access all of the content from your living room television set. From your PC, to your TV, to You; Show Center is the bridge that makes it happen.

$535

Websearch Code 213082

Pinnacle PCTV & PCTV PRO

Fully featured TV Tuner PCI cards to watch TV on a PC in ultimate image quality for an affordable price.

- Watch TV and listen to stereo radio (Pro Version) on your PC even while using other applications.
- Capture in MPEG1 or MPEG2 and burn VCDs, SVCDs or DVDs with your CD or DVD burner
- Fully featured remote control
- Capture Stills and more.

PCTV	PCTV Pro
$88	**$219**
Websearch Code LAK129	Websearch Code LAK130

Pinnacle PCTV Deluxe

Fully featured Personal Video Recorder & TV tuner in a plug-n-play external USB box.

- Watch & Record TV on your PC in full screen on your desktop or notebook PC.
- Hardware MPEG-2 encoding lets you record TV & video in VCD or DVD quality ready to burn to CD or DVD.
- Time-shifting lets you record TV & view your own replays.
- Fully featured remote control
- Capture still images from TV or video.
- USB 2.0

$465

Websearch Code 213289

Vision Plus Digital Terrestial TV Card

Includes:

- Electronic program guide
- Multi channel preview
- Real time digital recording
- View and record different DTV channels simultaneously
- Time shifting
- Digital HD TV
- Schedule recording
- Image capture
- Remote control
- Mpeg 1 and 2
- Teletext
- **USB (213078) $235**

$173

Websearch Code 213075

Vision Plus Satellite TV Tuner Card

Includes:

- Time shifting
- Real time digital recording
- Schedule recording
- Image capture
- Remote control
- Mpeg 1 and 2
- Electronic program guide
- Multi channel preview
- View and record different DTV channels simultaneously
- Teletext
- **Free to Air $129**

$215

Websearch Code 213077

Digital Binocular Camera

Includes:

- 2.1mega Digital Binocular Camera with SD memory slot
- 2.1 mega digital camera with 10x25 binocular
- External SD memory slot
- USB Mass Storage Function
- Built-in 8MB memory
- 60 seconds power saving
- Auto white balance
- Auto exposure
- Mass storage
- **Binoculars Only, (213081) $88**

$163

Websearch Code 213080

Sound XP XP201 Phono/Mic Pre-Amp Plus Diamond Cut 32

Achieve high quality transfer of old records and cassettes to your home PC in addition to offering a high quality microphone pre-amp and headphone amplifier. The XP201 phono/mic pre-amp is required to match the differing audio levels of record players, tape recorders, microphones, etc. Also do voiceover recordings for video and record you guitar or keyboard.

$149

Websearch Code 191408

Computer Products at Rock Bottom Prices

Adaptec XHub for Notebooks

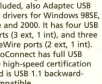
4-port USB 2.0 hub designed for mobile users, featuring four fully powered USB ports, USB 2.0 certification and backward compatible with USB 1.1. Includes USB 2.0 drivers and Adaptec's USBControl Utility.

$57

Websearch Code 213191

Adaptec DuoConnect PCI Card

A combination USB 2.0 and FireWire card for PCs and Macs. Sonic MyDVD 3 DVD creation software and MGI VideoWave 4 SE digital video editing software are included, also Adaptec USB 2.0 drivers for Windows 98SE, Me and 2000. It has four USB ports (3 ext, 1 int), and three FireWire ports (2 ext, 1 int). DuoConnect has full USB 2.0 high-speed certification and is USB 1.1 backward-compatible.

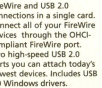


$111

Websearch Code 197651

Adaptec DuoConnect for Notebooks

FireWire and USB 2.0 connections in a single card. Connect all of your FireWire devices through the OHCI-compliant FireWire port. Two high-speed USB 2.0 ports you can attach today's newest devices. Includes USB 2.0 Windows drivers.



$178

Websearch Code 197602

Microsoft Optical Mouse Blue

Use the wider scroll wheel to move through documents quickly. Features Microsoft optical technology for a smooth and accurate experience. This mouse is comfortably shaped for the right and left hand. PS2/USB. Win/Mac.

$40

Websearch Code 192040

Microsoft Wireless Optical Mouse

Combines precise Microsoft optical tracking with revolutionary new tilt wheel technology, which enables side to side, as well as up and down scrolling. Your wireless freedom is made even more convenient with new longer battery life, providing many users with more than 6 months battery life. PS2/USB. Win/Mac.

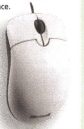
Steel	Blue Moon
$75	$75
Websearch Code...210977	Websearch Code...210978

Microsoft Basic Optical Mouse

Microsoft Optical Mouse Technology replaces the old-fashioned mouse ball and works on virtually any surface. Easy and comfortable to use, Basic Optical Mouse is the choice for value.

USB/PS2, Win/Mac

- **5 pack (197240)** $117



$24

Websearch Code 197233

Microsoft Wireless Optical Desktop

Reliable Microsoft optical technology in a great value wireless mouse and keyboard. Keyboard features a Multimedia Centre to easily navigate music, pictures and videos and instantly access popular functions. The precise mouse is comfortably designed for both right and left hand. USB/PS2 Interface, Win/Mac compatible.

$113

Websearch Code 210983

Microsoft MultiMedia Keyboard

One-touch buttons take you directly to your favorite multimedia activities – navigate music and video clips, surf the Web, and start the programs you use most. In a sleek black finish and with easy-to-use keys, the Microsoft MultiMedia Keyboard adds dynamic features and stylish looks to any desktop.

Multimedia	Multimedia Natural
$52	$76
Websearch Code...210975	Websearch Code...210976

Microsoft Basic Wireless Desktop

Get one-touch access to the functions and files you go to most. 27 MHz wireless technology gives the keyboard and mouse up to 2 metres of wireless freedom from the receiver (included). Perform common tasks from your keyboard. Press a button to undo, redo, new, open, close, reply, forward, send, spell, save, print, and access help.

$76

Websearch Code 210985

Logitech MX700 Cordless Optical Mouse

MX Optical Engine delivers more accuracy and control on more surfaces than ever before. Fast RF cordless technology delivers corded quality on a cordless device in a six foot range. Rapid charge base station ensures that your mouse is always ready. PS2/USB Win/Mac.

MX700	MX900
$99	$134
Websearch Code...193814	Websearch Code...211022

Logitech MOMO Racing Wheel & Pedals

Designed by the racing professionals at MOMO, the full rubber wheel, stick shifter and racing pedals feel just like the real thing. Features advanced force feedback technology.

- **Freedom 2.4 Joystick (202530)** $94

$166

Websearch Code 202529

Logitech QuickCam Orbit

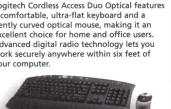
The QuickCam Orbit features a black, ball-shaped camera that sits atop a nine-inch-high stand at your eye level so you get optimal face time during your video calls or video instant messaging sessions. When you move the camera follows further to this it combines a microphone and connects through USB.

- **Quickcam Messenger (202643)** $71
- **Quickcam Messenger 2 pack (212973)** $109

QuickCam 4000	Orbit Camera
$154	$185
Websearch Code...190644	Websearch Code...209615

Logitech Cordless Access Duo Optical

Logitech Cordless Access Duo Optical features a comfortable, ultra-flat keyboard and a gently curved optical mouse, making it an excellent choice for home and office users. Advanced digital radio technology lets you work securely anywhere within six feet of your computer.



Access Duo	Access Dup Optical
$76	$86
Websearch Code...193084	Websearch Code...208630

Logitech Cordless MX Duo

Combining the cordless Elite keyboard and the MX-700 mouse, this combination provides all your needs for a clutter free desktop. Win/Mac

MX Duo	Comfort Duo
$138	$138
Websearch Code...195924	Websearch Code...197335

Logitech diNovo Media Desktop

Apart from being a bluetooth keyboard and mouse, the diNovo MediaPad is a Bluetooth remote commander for all your digital media. The MediaPad displays email or instant message notifications and it lets you monitor media selection playback status, even when you're away from your desk.

Cordless Desktop MX	Media Desktop
$260	$370
Websearch Code... 211021	Websearch Code... 214526

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Call 1300 300 003 or visit www.kreh.com.au as prices may change due to daily fluctuations and online discounts.

1300 300 003

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Telstra F2100 DECT Cordless Telephone

- Digital Enhanced Cordless Telephone (DECT) provides digital voice clarity and security.
- Telstra call number display.
- 10 number memory for speed dial.
- Caller list shows the last 10 numbers dialed.
- 13 hours talk time or 12 days standby.
- **With additional handset (195178) $115**

Websearch Code 195177 **$66**

Telstra F2150 DECT Cordless Telephone

- Digital Enhanced Cordless Telephone (DECT) provides digital voice clarity and security.
- Telstra call number display.
- 10 number memory for speed dial.
- Caller list shows the last 10 numbers dialed.
- 12 minutes record time.
- Time and date stamp of all incoming messages.
- Voice prompted for ease of use.
- Remote access from any tone dialing telephone.
- 13 hours talk time or 12 days standby.
- **With additional handset (207278) $157**

Websearch Code 207277 **$107**

Telstra F2200 DECT Cordless Telephone

- Digital Enhanced Cordless Telephone (DECT) provides digital voice clarity and security.
- Telstra call number display. Lets you know who is calling before you answer the call.
- 50 name and number memory for speed dial.
- Caller list shows the last 20 numbers dialed.
- Multi-handset compatible allowing a maximum of 5 cordless handsets on each base unit.
- Handsfree on Handset.
- 13 hours talk time or 12 days standby.
- **With additional handset (195180) $148**

Websearch Code 195175 **$82**

We stock a huge range of genuine and third party accessories!

Telstra F2300 DECT Cordless Telephone

- Telstra call number display.
- 50 name and number memory for speed dial.
- Caller list shows the last 20 numbers dialed.
- Multi-handset compatible allowing a maximum of 5 cordless handsets on each base unit.
- Handsfree on Handset.
- Fully digital answering machine.
- Time and date stamp of all incoming messages
- Voice prompted for ease of use.
- Remote access to your answering machine from any tone-dialing phone.
- **With additional handset (195183) $189**

Websearch Code 195182 **$124**

Telstra S25 Cordless Telephone

- Visual Ring Alert
- 3 one touch memory keys
- 10 indirect memories for fast access to frequently dialed numbers
- Redial key allows fast access to last number dialed.
- Desk or Wall mountable

Websearch Code 195198 **$25**

Telstra Slimline 50 Corded Telephone

- 2 one-touch memory keys
- 10 memory keys allowing fast access to frequently dialed numbers
- Redial key.
- Desk mountable slip resistant base.

Websearch Code 195463 **$46**

Nokia 6600

Integrated video recorder and camera (2x digital zoom). Send and receive SMS, email, images, animation, graphics, video and audio content.
Experience internet browsing with XHTML Browser, participate in teleconferences, check your emails, manage your contacts and schedule and includes wireless technology (Bluetooth).
Tri-band GSM 900/1800/1900.
Weight: 122g
Size: 108.6 x 58.2 x 23.7mm

No Contracts

Websearch Code 212389 **$777**

Nokia 1100

A reliable phone that complements your busy lifestyle. All your calling, messaging and menu functions can be easily accessed with its 2-way scroll and Navi key, large buttons and localized menu languages. With its anti-slip grip and built-in flashlight. The user-friendly reminder function keeps you on top of your daily schedule, alerting you of important appointments and dates.
Weight: 93g
Size: 106x46x20mm

No Contracts

Websearch Code 213959 **$166**

Nokia N-Gage Game Deck

It's a game deck, it's an MP3 player, it's a wireless browser, it's a phone. This lightweight handheld machine pumps out 3D graphics that do your favorite games justice! Surf the mobile Web, download Java-based games, send/reply to/forward messages containing image, text and sound (MMS). Includes digital music player and stereo FM radio, integrated voice and music recorder. Share information between the game deck and a compatible PC.
Weight: 137g
Size: 134x70x20mm

No Contracts

Websearch Code 210677 **$300**

Nokia 6100

The stylish, Nokia 6100 is packed with user-friendly features to give you an effective way to communicate. It helps you organize meetings, remember anniversaries and stay connected to your friends and family effortlessly. Check out its features and enhancements that are specially designed to match the demands of your dynamic lifestyle.
Weight: 78g
Size: 102x44x17.2mm

BONUS Camera Headset

Websearch Code 211103 **$424**

Nokia 3200

Integrated digital camera. Multimedia Messaging with full integration of text, images and audio clips. High-resolution, passive matrix color display supports up to 4096 colors within 128x128 pixels. Find your way in the dark with the integrated flashlight. Advanced polyphonic ringing tones.
Weight: 90g
Size: 108x45x21mm

No Contracts

Websearch Code 212387 **$359**

Nokia 7250i

The tri-band Nokia 7250i not only catches your attention, it captures your imagination. An integrated camera with night mode. Simply point and shoot.
Personalise your Phonebook with the images of your contacts. Its XHTML browser delivers a richer Internet experience while a keymat button gives you quick access to wireless Internet surfing.
Weight: 92g
Size: 105x44x19mm

No Contracts

Websearch Code 209052 **$516**

Big Blue Pre-Paid Internet

Big Blue brings you the reliability and ease of use of dial-up internet. Explore the features and benefits of the competitive range of Big Blue dial-up access plans.

- Free Technical Support - 24 Hrs, 7 days a week, 365 days a year.
- Nationwide Coverage - connect almost anywhere in Australia for the cost of a local call.
- 5 Free Email Addresses
- My Account - view account details, check usage and billing info online
- Webmail - check your Big Blue email from anywhere in the world
- Online Support - extensive online Technical Support
- Webspace - 10 MB personal homepage space

- **1 Month (196220) $27.95**
- **6 Month (196222) $139.95**
- **12 Month (196223) $269.95**

3 months **$74.95**

Websearch Code 196221

Verbatim DataLifePlus CD-R 80min 52x 10 Pack (Slim Case)

Verbatim's innovative "Super Azo" recording dye is optimised to provide stable and reliable high-speed recording and the industries widest range of compatibility for today's 52x CD-R drives. Features a dual-protection layer that safeguards the recording layer and provides a longer archival life.

$10
Websearch Code 193846

Verbatim Digital Vinyl CD-R 80min 10 Pack (Jewel Case)

A recordable disc designed after the popular and groovy 45-rpm record format. The colour-coded discs use Verbatim's original Azo Blue technology for superior audio writing performance on CD burners and broad read compatibility on car CD players.

- **50 Spindle** (212702) **$33**

$10
Websearch Code 196442

Verbatim DataLifePlus CD-RW 74min 16-24x (Slim Case)

Provides superior reliability and durability at 24x re-write speeds. Only compatible for recording and re-writing on CD-RW drives with the Ultra-Speed CD-RW logo. Supported by Verbatim's Lifetime Warranty.

$2
Websearch Code 193849

HP DeskJet Cartridges

Websearch	Product Description	Price
192529	HP Ink Cartridge No 15 Black for DJ 810c/812c/840c/845c - C6615DA	$43
HPI034	HP Ink Cartridge No 20 Black for DJ 610C/630C/640C - C6614DA	$43
130079	HP Ink Cartridge No 23 Colour for DJ 720C/880C/890C - C1823DA	$48
208444	HP Ink Cartridge No 29 Black for DJ 600/610/630C - 51629AA	$42
193787	HP Ink Cartridge No 27 Black for DJ 3420 - C8727AA	$27
193788	HP Ink Cartridge No 28 Colour for DJ 3420 - C8728AA	$32
190196	HP Ink Cartridge No 45 Black for DJ 710C/720C/830C - 51645AA	$42
HPI007	HP Ink Cartridge No 49 Colour for DJ 600/610C/630C - 51649AA	$45
192835	HP Ink Cartridge No 57 Colour for DJ 5550C - C6657AA	$46
193526	HP Ink Cartridge No 58 Photo Colour for DJ 5550 - C6658AA	$36
209696	HP Ink Cartridge No 59 Grey Photo - C9359AA	$36
190354	HP Ink Cartridge No 78 Colour for DJ 900/1220C - C6578DA	$47

HP Mono LaserJet Toner Cartridges

Websearch	Product Description	Price
209605	HP Toner Cartridge for LaserJet 1010/1015 - Q2612A	$94
HWP001	HP Toner Cartridge for LaserJet 1100/3200 Series 2,500 Pages - C4092A	$79
206315	HP Toner Cartridge for LaserJet 1150 Series - Q2624A	$99
192755	HP Toner Cartridge for LaserJet 1200 Series 3,500 Pages - C7115X	$117
197391	HP Toner Cartridge for LaserJet 1300 Series 4,000 Pages - Q2613X	$124
HWP002	HP Toner Cartridge for LaserJet 2100/2200 Series 5,000 Page - C4096A	$140
206312	HP Toner Cartridge for LaserJet 2300 Series - Q2610A	$159
129465	HP Toner Cartridge for LaserJet 4/5 Series 6,000 Pages - 92298A	$125
192571	HP Toner Cartridge for LaserJet 4000 Series 10,000 Pages - C4127X	$175
192673	HP Toner Cartridge for LaserJet 4100 Series 10,000 Pages - C8061X	$175
196353	HP Toner Cartridge for LaserJet 4200 Series 12,000 Pages - Q1338A	$209
206291	HP Toner Cartridge for LaserJet 4300 Series - Q1339A	$274
129890	HP Toner Cartridge for LaserJet 8100 Series 20,000 Pages - C4182X	$249
206424	HP Toner Cartridge for LaserJet 9000 Series 30,000 - C8543X	$365

HP Colour LaserJet Toner Cartridges

Websearch	Product Description	Price
194495	HP Toner Cartridge for Colour LaserJet 1500/2500 Black - C9700A	$120
194496	HP Toner Cartridge for Colour LaserJet 1500/2500 Cyan - C9701A	$135
194497	HP Toner Cartridge for Colour LaserJet 1500/2500 Magenta - C9703A	$135
194498	HP Toner Cartridge for Colour LaserJet 1500/2500 Yellow - C9702A	$135
213667	HP Toner Cartridge for Colour LaserJet 3500/3700 Black - Q2670A	$176
213668	HP Toner Cartridge for Colour LaserJet 3500/3700 Cyan - Q2671A	$176
213670	HP Toner Cartridge for Colour LaserJet 3500/3700 Magenta - Q2673A	$176
213669	HP Toner Cartridge for Colour LaserJet 3500/3700 Yellow - Q2672A	$176
192760	HP Toner Cartridge for Colour LaserJet 4600 Black - C9720A	$215
192761	HP Toner Cartridge for Colour LaserJet 4600 Cyan - C9721A	$282
192762	HP Toner Cartridge for Colour LaserJet 4600 Magenta - C9723A	$282
192763	HP Toner Cartridge for Colour LaserJet 4600 Yellow - C9722A	$282
194491	HP Toner Cartridge for Colour LaserJet 5500 Black - C9730A	$295
194492	HP Toner Cartridge for Colour LaserJet 5500 Cyan - C9731A	$409
194493	HP Toner Cartridge for Colour LaserJet 5500 Magenta - C9733A	$409
194494	HP Toner Cartridge for Colour LaserJet 5500 Yellow - C9732A	$409
194708	HP Toner Cartridge for Colour LaserJet 8500 Black - C4149A	$169
208451	HP Toner Cartridge for Colour LaserJet 8500 Cyan - C4150A	$234
194709	HP Toner Cartridge for Colour LaserJet 8500 Magenta - C4151A	$234
208452	HP Toner Cartridge for Colour LaserJet 8500 Yellow - C4152A	$234

Visit www.iswh.com.au for the full range of the above listed brands and other popular brands including Kyocera-Mita, Minolta, Samsung and Oki not listed here.

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and enquire about discounts due to daily fluctuations and online discounts.

1300 300 003

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Canon BubbleJet Cartridges

Websearch	Product Description	Price
130500	Canon Ink Cartridge for BJ 3000/5400/5400SP Black - BCI3EBK	$20
130499	Canon Ink Cartridge for BJ 3000/5400/5400SP Cyan - BCI3EC	$17
130498	Canon Ink Cartridge for BJ 3000/5400/5400SP Magenta - BCI3EM	$17
130497	Canon Ink Cartridge for BJ 3000/5400/5400SP Yellow - BCI3EY	$17
189066	Canon Ink Cartridge for BJ 4000/4100/4550 Black - BCI21BK	$13
189067	Canon Ink Cartridge for BJ 4000/4100/4550 Colour - BCI21C	$32
192570	Canon Ink Cartridge for BJ S300/i320/S330 Black - BCI24BK	$13
192569	Canon Ink Cartridge for BJ S300/i320/S330 Colour - BCI24C	$28
190434	Canon Ink Cartridge for BJ S800/S820/S820D/S830D Black - BCI6BK	$22
190436	Canon Ink Cartridge for BJ S800/S820/S820D/S830D Cyan - BCI6C	$22
190437	Canon Ink Cartridge for BJ S800/S820/S820D/S830D Magenta - BCI6M	$22
190439	Canon Ink Cartridge for BJ S800/S820/S820D/S830D Yellow - BCI6Y	$22
210442	Canon Ink Cartridge for BJ i70 Black - BCI15BK	$24
210443	Canon Ink Cartridge for BJ i70 Colour - BCI15C	$40

Epson Stylus Ink Cartridges

Websearch	Product Description	Price
193775	Epson Ink Cartridge for Stylus C41UX/SX/CX43UX/SX Black - T038	$17
200348	Epson Ink Cartridge for Stylus C41UX/SX/C43UX/SX Colour - T039	$26
130914	Epson Ink Cartridge for Stylus C60/61 Black - T028	$38
189243	Epson Ink Cartridge for Stylus C60/61 Colour - T029	$35
208296	Epson Ink Cartridge for Stylus C70/C80/C82 Black - T032190	$45
190623	Epson Ink Cartridge for Stylus C70/C80 Cyan - T032290	$22
190624	Epson Ink Cartridge for Stylus C70/C80 Magenta - T032390	$22
190625	Epson Ink Cartridge for Stylus C70/C80 Yellow - T032490	$22
208314	Epson Ink Cartridge for Stylus C82 Cyan - T042290	$20
208312	Epson Ink Cartridge for Stylus C82 Magenta - T042390	$20
208313	Epson Ink Cartridge for Stylus C82 Yellow - T042490	$20
EPS334	Epson Ink Cartridge for Stylus 440/460/640 Black - TOS0190	$27
EPS303	Epson Ink Cartridge for Stylus 400/600/800 Colour - TOS0290	$35

Fuji Xerox Phaser Toner Cartridges

Websearch	Product Description	Price
204530	Fuji Xerox Toner Cartridge for 6200 High Capacity Black	$132
204531	Fuji Xerox Toner Cartridge for 6200 High Capacity Cyan	$363
204532	Fuji Xerox Toner Cartridge for 6200 High Capacity Magenta	$363
204533	Fuji Xerox Toner Cartridge for 6200 High Capacity Yellow	$363
196249	Fuji Xerox Toner Cartridge for 7300 High Capacity Black	$264
196250	Fuji Xerox Toner Cartridge for 7300 High Capacity Cyan	$599
196251	Fuji Xerox Toner Cartridge for 7300 High Capacity Magenta	$599
196252	Fuji Xerox Toner Cartridge for 7300 High Capacity Yellow	$599
204591	Fuji Xerox Toner Cartridge for 7700 High Capacity Black	$148
204588	Fuji Xerox Toner Cartridge for 7700 High Capacity Cyan	$380
204589	Fuji Xerox Toner Cartridge for 7700 High Capacity Magenta	$380
204590	Fuji Xerox Toner Cartridge for 7700 High Capacity Yellow	$380

Lexmark Optra Toner Cartridges

Websearch	Product Description	Price
195001	Lexmark Toner Cartridge for Optra S 17.6K – 1382925	$315
195002	Lexmark Toner Cartridge Remanufactured for Optra S 17.6K - 12A0150	$272
195003	Lexmark Toner Cartridge for Optra T 25K - 12A5845	$435
195004	Lexmark Toner Cartridge for Optra T Remanufactured 25K - 12A5140	$368
195005	Lexmark Toner Cartridge for Optra T 52K Series 20K - 12A6835	$429
195006	Lexmark Toner Cartridge for Optra T 62K Series 30K - 12A6865	$482
207977	Lexmark Toner Cartridge for Optra T630/T632 21K Prebate - 12A7462	$361

We carry a full range of supplies.
Please call 1300 300 003 if your supplies are not listed above.

Verbatim CopySmartPlus CD-R 3 Drive

Stand Alone Duplicator

No PC required! Makes stand alone manual copying easy and affordable. Standalone 3 drive 40x max CD-R, 12x max CD-RW Duplicator Tower. Utilises an LCD panel and a simple 4 button user interface.

CD-R 3 Drive

$1249

RENTSMART Rent to own from $13.69 PER WEEK*

Websearch Code 194859

Primera Bravo CD-R/DVD-R Drive

Automated Duplicators/Printer

Combines automatic, robotic-based duplication along with full-colour, 2400 dpi disc printing - all in one compact, desktop unit. Up to 25 discs per job are automatically produced - hands-free and totally unattended!

CD-R/DVD-R Drive

$4499

RENTSMART Rent to own from $42.05 PER WEEK*

Websearch Code 194857

Verbatim DataLifePlus DVD-R 4.7GB 4x

Jewel Case

Offers 4.7GB of write-once storage capacity, superior recording quality, and compatibility with 1x to 4x DVD-R writers. Achieve data transfer rates of up to 5.54 MB/sec. and write a complete 4x 4.7GB disc in about 15 minutes.

$5

Websearch Code 208026

Computer Products at Rock Bottom Prices

Creative Nomad MuVo 64MB

Plug the MuVo Memory into any computer USB port and it will show up automatically as removeable storage on the desktop. Drag and drop your MP3s/WMAs and files straight onto the NOMAD MuVo. When used with the included battery pack, the NOMAD MuVo works as a tiny MP3 player with incredible sound quality. The NOMAD MuVo plays for up to 12 hours on one alkaline AAA battery.

- 64mb $249

128MB

$279

Webesarch Code 191515

Creative Sound Blaster Extigy

With 24-bit DACs and a 100dB signal-to-noise ratio, hardware Dolby Digital decoding, multi-channel output and 24-bit/96kHz compatible connectivity, the Sound Blaster Extigy gives a powerful high-end audio and home theatre experience.

Standard

$299

Webesarch Code 191513

Creative Sound Blaster Audigy 2

Sound Blaster Audigy 2 delivers high-quality multi-channel recording and playback at up to 24-bit/96kHz and is the first PC product to offer playback of Advanced Resolution DVD-Audio at 24-bit/192kHz with a Signal-to-Noise ratio of 106dB. With EAX Advanced HD, 6.1 speaker support, Dolby Digital EX support and THX Certification.

- Sound Blaster Platinum $425

Standard

$229

Webesarch Code 194943

Imation CD Media & Diskettes

Imation CD-R and CD-RW media have a high-quality dye layer that ensures lower failure rates. Each disc is tested to meet Imation's exacting standards to protect against the toughest environmental conditions

Webesarch	Product Description	Price
210763	Imation CD-R 80min 700MB 48X Slim Jewel Case 10 Pack	$8
195042	Imation CD-R Mini 23Min 202MB 5 Pack Neon	$6
194393	Imation CD-R 80min 700MB 40x Slim Jewel Case Black 20	$20
209035	Imation CD-R 80Min 700MB Digital Audio 48x Spindle 25 Pack	$25
196653	Imation CD-RW Mini 185MB/21Min 10 Pack	$18
209037	Imation CD-RW 80min 700MB 4X 10 Pack	$17
209038	Imation CD-RW 80min 700MB 4x-10x Jewel Case 5 Pack	$9
194278	Imation 3.5" Floppy Disks IBM Format 10 Pack	$4.95
213358	CD/DVD Black Slim Jewel Cases 25 Pack	$11
213359	CD/DVD Neon Slim Jewel Cases 25 Pack	$11

Imation DVD Media

Recording movies, creating interactive training, backing up or archiving massive amounts of data are just a few options. Imation offers all the key DVD formats, like the write-once DVD+R and DVD-R media, or DVD rewritable formats like DVD-RAM, DVD+RW, and DVD-RW. DVD media is the next generation data storage solution, giving you huge storage capacities and incredible sound and picture quality.

Webesarch	Product Description	Price
194277	Imation DVD-R Media 4.7GB Jewel Case 1 Pack	$4
193917	Imation DVD-R Media 4.7GB Spindle 25 Pack	$65
193916	Imation DVD+RW Media 4.7BG Jewel Case 1 Pack	$6
209042	Imation DVD-RW Media 4.7GB 5 Pack	$28
213360	Imation DVD+R 4x 1 Pack	$4
209039	Imation DVD+R Media 4.7GB 5 Pack	$19
192772	Imation DVD+RW Media 4.7GB Jewel Case 1 Pack	$6
209040	Imation DVD+RW Media 4.7GB 5 Pack	$28

Purchase the following Imation products to recieve your instant reward!

*Free CDs, DVDs and Games are available on www.maximusic.com.au when you redeem your $10, $15 or $20 E-Voucher. Accumulate up to 5 vouchers for a maximum claim of $50. *Limited time only. E-Vouchers valid till 12.00pm EST 31st July, 2004.

Webesarch	Product Description	Price
213352	CD-R 48x 700MB/80Min 25 Pack Spindle with $10 E-Voucher	$18
213353	CD-R 48x 700MB/80Min 50 Pack Spindle with $15 E-Voucher	$30
213354	CD-R 48x 700MB/80Min 100 Pack Spindle with $20 E-Voucher	$55
213356	CD-RW 4x-10x Neon 10 Pack with $10 E-Voucher	$22
213355	DVD-R 4x 4.7GB 5 Pack with $10 E-Voucher	$17

Imation CD-RW and DVD Drives

Webesarch	Product Description	Price
213357	Imation CD-RW 52x32x52 Internal Drive	$99
214748	Imation CD-RW 52x32x52 USB 2.0 External Drive	$195
214749	Imation CD-RW / DVD 24x24x24x8 External Combo Drive	$280
214750	Imation DVD-R/+R Dual Format Internal Drive	$355

Whether you choose CD or DVD to backup, Imation have the Optical Drive to suit your needs! Now you can create your own digital masterpieces and share them with ease. All Drive Kits come complete with everything you need to get started, including the latest software.

Imation 4mm, 8mm DLT, LTO & SDLT Tape Cartridges

Webesarch	Product Description	Price
192766	Imation Data Tape 4mm 125m DDS-3	$14
192767	Imation Data Tape 4mm 150m DDS-4	$23
194261	Imation Data Tape AIT 2 8mm 230m 50/100GB	$112
194474	Imation Data Tape AIT 3 8mm 100/260GB	$119
192707	Imation Data Tape DLT IV 20/80GB (drive dependent)	$49
194262	Imation Data Tape Super DLT 160/320GB (drive dependent)	$105
192768	Imation Data Tape LTO Ultrium 100/200GB (drive dependent)	$58
196261	Imation LTO Ultrium Gen 2 200/400GB Cartridge	$127

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Microsoft

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*Office 2003 Standard based on minimum 5 license purchase if you are a new MOLP customer. Office 2003 Professional from $779 based on minimum 5 license purchase if you are a new MOLP customer.

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Adobe

The Adobe Transactional License Program (TLP) is a volume licensing solution that allows organisations to acquire Adobe software at a discount, based on the quantity of software licensed in a single transaction. Each Adobe product is assigned a point value (e.g. Acrobat = 1 point), and you receive a volume discount based on the point value of your transaction. Minimum 5 points to qualify!

City Software has recently become 1 of 5 Adobe Licensing Centres in Australia!

*Adobe Creative Suite Standard (Includes Photoshop, Illustrator, InDesign & Version Cue) based on minimum 5 point purchase (Adobe CS Std = 3 points) on Corporate TLP program. Adobe Creative Suite Premium (Includes Photoshop, Illustrator, InDesign, GoLive, Acrobat 6 Professional & Version Cue) from $1,979 per license based on minimum 5 point purchase (Adobe CS Pro = 6 points) on Corporate TLP program.

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Macromedia Volume License Program (MVLP)

macromedia

Whether you are a commercial, government, or education customer, the Macromedia Volume License Program (MVLP) offers flexible licensing solutions that help volume customers save time and money. Both software and subscription offerings are available though MVLP. Each product/offering is assigned a point value. 12 points are the minimum requirement for initial orders, 0 points for re-orders. For example, Studio MX is worth 4 points, Dreamweaver is worth 2 points, etc.

* Macromedia Dreamweaver MX 2004 based on new commercial customer purchasing with minimum of 10 points.

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The Symantec Security Licence Program makes it easy to purchase Symantec enterprise security software solutions. The Symantec Value Program is a simple transactional plan that provides volume incentives for orders of as few as one server or 10 desktop licences, and rewards the purchase of multiple product types within a product family. As a certificate-based program, the Symantec Value Program is ideal for small to mid-sized companies. Customers simply purchase a media pack and the number of licences required from their reseller, and then receive the certificate from Symantec. Special pricing for academic institutions is also offered through the Value Program.

*AntiVirus Corporate Edition 8.1 (Workstation & Network Server) on minimum 10 license purchase (10-24 user pricing) on Symantec VLP.

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VERITAS

VERITAS' VIP program is a cost effective way to easily acquire and deploy their market leading storage management software - Backup Exec. VIP offers customers volume purchase incentives, immediate discounts, flexibility to suit their business needs and a simply point system - tracked by VERITAS.

Enrolments in the open plan requires an initial order of only 10 points - s it is simple to qualify. The initial price depends upon the number of accumulated points at the time of purchase. Future orders may increase the discount.

*For any VIP purchase made from 1st September to 31st December, 2003 - Level A and Level B pricing will be combined. This means that all purchases between 7 - 999 points will qualify for Level B pricing
EG: Backup Exec 9 Windows Server License - $1045
Backup Exec 9 Windows Server Mandatory Support (Vsupport) - $239

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Computer Associates

Customers who purchase "Product + Maintenance" SKUs under CA's Licensing programs - Open Licence Program (OLP) or Master Licence Program (MLP) - receive the following benefits: 1) Software Licence purchased; 2) Upgrade Protection - which entitles the Licensee to free product upgrades; and 3) 24x7 telephone-based technical support. SKUs are available in 1, 2 or 3-year options.

Note: Government and Academic customers automatically qualify for the CA Master Licence Program which provides them with the best possible pricing.

* eTrust Secure Content Management (eSCM) provides organisations with an integrated, policy-based content security solution to defend against business and network integrity threats. These threats include misuse of email (Spam) and the Web, confidentiality breaches, exposure to email legal liability, unsolicited email, viruses, mobile code threats and other offensive material.

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(For SBS)

Comprehensive, cost effective protection for Microsoft Windows server environments. High performance agents and options deliver flexibility to help protect data quickly and reliably.

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Standard
$849
Webseach Code 214597

CA ARCserve Backup 9

Manage multiple backup jobs, devices and databases with one single view. Select multiple servers, clients and databases. Restore files from a single file to a whole volume.

- **Upgrade from 6.61/2000 (193749) $549**

Full
$749
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CA eTrust Antivirus 7

For Windows Workgroup Edition - 5 clients

CA's award-winning antivirus solution. Automated virus signature updates and centralised management ensure your network is protected against potentially damaging and costly virus incidents.

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Full
$199
Webseach Code 195892

Microsoft Works 7

Works 7.0 is the latest version of the popular essential home productivity software. It includes a word processor, spreadsheet, database, calendar. Plus Works has new, professionally designed templates, and a new tool to help organize common projects.

Licensing and academic licensing price available.

$79

Websearch Code 191400

Microsoft Digital Image Suite 9

Digital Image Suite offers one integrated complete solution for all of your digital imaging needs. Packed with all of the tools you need to organise your photos, edit them using hundreds of tools, print and share your work, and archive photos for safekeeping.

Licensing and academic licensing price available.

$165

Websearch Code 208736

Microsoft Encarta Premium Suite 2004

Encyclopedia with research and learning tools. Dictionary & Thesaurus, Literature Guides and Chart Maker.

Licensing and academic licensing price available.

- **Standard (210856) $41**
- **Plus (209495) $77**

CD-Rom-DVD

$139

Websearch Code .. 209496-209497

Microsoft Works Suite 2004

Works Suite includes five popular Microsoft home products in one, easy-to-use package. Works Suite includes Microsoft Works, Microsoft Word and the latest versions of Microsoft Money Standard, Microsoft Encarta standard, and Microsoft Picture It! Photo Premium.

$183

Websearch Code 209485

Microsoft MSDN Universal 7

Provides priority access to essential resources for developers, including timely delivery of everything you need to build XML Web services and applications. Get uninterrupted access to the latest Microsoft technologies 24 hours a day 7 days a week online and through regular CD or DVD updates.

- **Upgrade/Renewal (189644) $3595**
- **Full (130922) $4345**

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Academic*

Websearch Code 130912

$1299

Microsoft Exchange Server 2003 Standard

Designed to meet the messaging and collaboration needs of small and medium-size corporations. With Exchange 2003 Standard Edition, you get: Exchange 2003. The flexibility to be configured as a Microsoft Office Outlook Web Access front-end server. 16-gigabyte data storage maximum. Recovery Storage Group.

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Microsoft Visual Studio.Net Professional

Visual Studio.net Professional will enable developers to build next generation Internet applications that target any internet device and integrate with any platform.

- **Upgrade (213772) $849**
- **Full (213874) $1695**

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$141

Microsoft Publisher 2003

Publisher 2003 is a comprehensive solution for creating and publishing a wide variety of publications for desktop printing, commercial printing, e-mail distribution, or viewing on the Web. Publisher 2003 looks and works more like other programs in the Microsoft Office System, making it easier to use the right Office tool for the task.

- **Upgrade (210107) $165**
- **Full (210106) $275**

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Websearch Code 210105

$145

Microsoft Visio 2003 Std

Microsoft Office Visio 2003 gives business and technical users the power to visualize and communicate ideas, information, and systems. Use the simple, flexible tools in Visio 2003 to easily create business and technical charts and graphics that capture your inspiration and communicate it with impact.

- **Standard Upgrade (210120) $155**
- **Full (210119) $315**

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Websearch Code 210118

$95

Microsoft Small Business Server 2003

Access your desktop remotely from any browser - anywhere in the world - 24x7. Collaborate on projects via an auto deployed Windows Sharepoint Services site Best of breed email and calendaring solution with Exchange 2003 and Outlook 2003.

- **SBS 2003 Premium (211369) $2349**

Standard

Websearch Code 211368

$999

Microsoft Visual Basic .net Standard

Reengineered to be a first-class language on the Microsoft .NET Framework, it provides the easiest and most productive route for new developers and existing Visual Basic programmers to quickly build Windows-based applications.

- **Full (197083) $165**

*for non-commercial use only

Academic*

Websearch Code 197350

$88

Microsoft Visio 2003 Pro

Microsoft Office Visio Professional 2003 includes a full range of diagrams for business and technical professionals to create network and directory sevice diagrams, software, database, website diagrams, engineering drawings and building space and floor plans.

- **Pro Upgrade (210117) $385**
- **Full (210116) $785**

*for non-commercial use only

Academic*

Websearch Code 210115

$219

Microsoft SQL Server 2000 Standard

Relational Database Management and Analysis System. Great support for Web standards, powerful tools for system management and tuning, and exceptional scalability and reliability for your money make SQL Server 2000 the best choice for the next generation of enterprise-class database solutions.

- **Full 5 Client (193920) $2299**

*for non-commercial use only

Academic 10 Client*

Websearch Code 130171

$1489

Microsoft Visual C++ .net Standard

Visual C++ .NET is the most powerful C++ tool for creating the highest-performance software for Windows and the Web. Including features like, IntelliSense Technology, Edit and Continue which significantly speeds the development process.

- **Full (197469) $165**

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Academic*

Websearch Code 197470

$88

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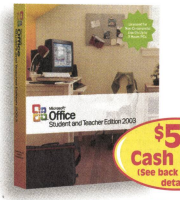


$50 Cash Back (See back page for details)

Why get 2003 MS Office?

Microsoft Office 2003 Editions deliver significant improvements over previous versions of Office, including:

- Advanced e-mail management tools to help you fight back against spam and viruses better than ever before.
- Improved automatic document recovery and compatibility with older files, which mean fewer worries about lost data.
- Brand-new collaboration features to allow you to share work easily and stay connected anytime, anywhere.

Microsoft Office	Student & Teacher Edition*	Standard Edition	Small Business Edition	Professional Edition
Word	●	●	●	●
Excel	●	●	●	●
PowerPoint	●	●	●	●
Outlook	●	●	●	●
Outlook with Contact Manager			●	●
Publisher			●	●
Access				●
Enhanced XML Technology				●
Enhanced IRM Technology				●

* For non-commercial use only. Must be a "Qualified Educational User." See Student and Teacher Edition 2003 package for details.

MS Office 2003 Editions work best with Windows XP

- If you use Windows XP or Windows 2000, then Office 2003 is the right choice for you.
- If you use Windows 98 or Windows Me, you should consider upgrading to Windows XP.
- If upgrading to Windows XP is not an option for you, then Office XP is the best way to go.

Student & Teacher Edition*	Standard Edition Upgrade	Standard Edition Full	Small Business Upgrade	Small Business Full
$249	$385	$635	$449	$725
Websearch Code..... 210114	Websearch Code..... 210093	Websearch Code..... 210092	Websearch Code..... 210096	Websearch Code..... 210097

*for non-commercial use only

Pro Edition Academic	Pro Edition Upgrade	Pro Edition Full
$295	$515	$795
Websearch Code..... 210094	Websearch Code..... 210096	Websearch Code..... 210095

Microsoft Office v.X for Mac Student & Teacher

Combines compatibility between Macs and PCs with ease of use to give you the tools to create rich documents, useful spreadsheets and compelling presentations.

$255
Websearch Code..... 209719

Microsoft Office v.X for Mac Standard

Includes Microsoft Word X, Entourage X, Excel X, and PowerPoint X—designed exclusively for Mac OS X. **Licensing and academic licensing price available.**

- **Upgrade (MS5710) $383**

Full
$595
Websearch Code..... MSS709

Microsoft Office v.X for Mac Pro

Includes a suite of programs Microsoft Word X, Entourage X, Excel X, and PowerPoint X—designed exclusively for Mac OS X. Plus, this edition of Office X includes Virtual PC 6.1 for Mac with Microsoft Windows XP Professional.

- **Full (209551) $785**

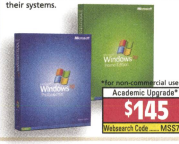
Upgrade
$519
Websearch Code..... 209552

Microsoft Windows XP Home

Windows XP Home Edition is an excellent choice for most home users, with exciting new features that help you do more with your computer.

Microsoft Windows XP Professional

Windows XP Professional, provides the highest levels of performance, productivity and security. It is the best choice for business users and for home users who demand the most from their systems.



Home

Upgrade	Full
$199	$399
Websearch Code..... MSS701	Websearch Code..... MSS700

Professional

*for non-commercial use only

Academic Upgrade*	Upgrade	Full
$145	$398	$589
Websearch Code..... MSS704	Websearch Code..... MSS703	Websearch Code..... MSS702

Microsoft Plus! Digital Media Edition

Share your photos and enjoy your music and home movies. Create vibrant photo stories with your narration, music and photo effects. Transform your PC into a full-featured party jukebox with visual effects while protecting your personal information and restricting access to other applications. Copy your aging cassette tapes and vinyl records into clean, vibrant digital files using hiss and pop reduction, track splitting and more.

$39
Websearch Code..... 194602

Microsoft Project Standard 2003

Microsoft Office Project Standard 2003 is used by project managers who need a desktop tool to manage their projects independently but who do not require strong coordination with other project managers or the ability to manage resources from a central repository.

- **Upgrade (210110) $535**
- **Full (210109) $935**

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Academic*
$99
Websearch Code..... 210108

Microsoft Project Professional 2003

Microsoft Office Project Professional 2003 is the desktop enterprise project management program that is used with MS Office Project Web Access and MS Office Project Server 2003. All the core scheduling tools in Project Standard 2003, plus powerful portfolio and resource management capabilities when connected to Project Server 2003.

- **Upgrade $935**
- **Full (210111) $1549**

*for non-commercial use only

Academic*
$271
Websearch Code..... 209772

MS Windows Server 2003

Windows Server 2003, Standard Edition is the network operating system for small organisations and departmental use. It delivers intelligent file and printer sharing, secure Internet connectivity, centralised desktop application deployment, and Web solutions that connect employees, partners, and customers.

- **Std 5 Client (195945) $1615**
- **Std 10 Client (195946) $1949**

Enterprise Available. *for non-commercial use only

Std 5 Client Academic*	Std 10 Client Academic*
$685	$849
Websearch Code..... 195944	Websearch Code..... 195947

NTI CD-Maker Platinum

NTI CD-Maker Platinum is your solution for burning CDs and DVDs. The integrated user interface delivers fast and easy burning in a few EasySteps. Safeguard, Organise and Share all of your files with one, easy-to-use CD and DVD burning solution. Whether you're storing data files, organising digital photos, creating a video library or enhancing your music collection, NTI CD-Maker Platinum makes burning your own CDs and DVDs as easy as saving a file. Burn music onto CD just the way you want it with MP3 encoding plus WAV editing and NTI CD-Maker Platinum is your ticket to the ultimate music collection. Record live audio to CD in real-time. Record business meetings or archive classic LPs and cassettes.

- **NTI CD Maker Pro** (214519) $77

$88

Websearch Code 195243

MAUS Quality Assurance

Whether you looking to gain Accreditation & Certification under the ISO 9000:2000 standards or just to streamline the systems in your business, MAUS Quality Assurance is the ideal solution.

MAUS has created the ideal tool to take you step-by-step through creating a customised Quality Manual that meets the current ISO 9000:2000 standards. Utilising a unique Question and Answer approach, MAUS Quality Assurance explains exactly what the ISO standards are seeking to achieve. Also comes complete with sample forms and an on-going Document Control log.

Websearch Code 197072 **$385**

MAUS MasterPlan

Award Finalist in the Telstra Small Business Show Software awards

For people who need a winning, professional Business or Marketing Plan, MasterPlan's simple step-by- step question and answer format enables you to construct full financials, text and graphics in no time at all! Sample plans, real life examples and a unique financial wizard will ensure you prepare a perfect plan every time.

- Simple and detailed Business and Marketing Plans
- Analysing and growing your business
- Starting a new business
- Forming new strategies and ideas
- Applying for finance
- Launching a new product or service
- Gaining a competitive advantage

Websearch Code 129545 **$175**

MAUS Stockmarket Plus 5

Award Finalist in the Channel 9 small business show software awards

One of the biggest selling personal investment software tools in Australia. The application is a 4 in 1 Investment Software Tool. It handles shares, options, warrants, property, managed funds, fixed interest and a range of other investments with ease! Can now be used in conjunction with online bank accounts.

MAUS Stockmarket Plus provides investors with a comprehensive, yet user friendly tool which will allow you to not only keep track of your investments but provide you with enough vital data to make informed investment decisions.

Websearch Code 191498 **$175**

NTI Backup Now Deluxe DVD Edition

Your personal computer is constantly under attack. It can suffer at the hands of the latest virus. You never know when your system may crash or your hard drive may fail. The need to protect your system, and the valuable data it contains, is paramount in today's fast-paced, globally-connected, internet society. The award-winning NTI Backup NOW! Deluxe is your easy and complete backup solution. Sporting an easy-to-use interface, it saves you from the often complicated chore of data backup. More importantly, it gives you the peace of mind that comes with knowing that your important data — or your entire hard drive — is safe and secure and can be recovered in a moment's notice should a disaster strike!

- **NTI Backup Now Deluxe CD** (207364) $88

DVD Edition

$115

Websearch Code 207583

MAUS Performance Review

- Save up to 90% of the time spent performing employee appraisals.
- Record day to day problems and accomplishments more efficiently.
- Includes Performance log; goals, critical incident reporting.
- Intelli-text technology to create eloquent text and to avoid incorrect wording.
- Expert Human Resource advice and coaching ideas are provided at each stage of the review, ensuring that your reviews will meet HR best practice. The software also includes an on-going performance log that gives you the power to record the week-to-week performance of your staff.

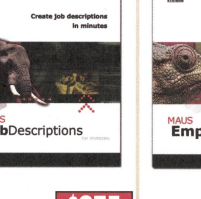
Websearch Code 189782 **$229**

MAUS Job Descriptions

Create clear, concise job descriptions in minutes. Choose from over 3,800 customisable job descriptions selectable by job title or industry. Use the question and answer format to address physical and educational requirements, work environment, qualifications and supervisory duties.

At the click of a button MAUS Job Descriptions will provide you with:

- An accurate concise library of cutomisable job descriptions
- Expert HR advice
- Custom interview questions and rating forms
- An 'Ad Writer' to help you write and place effective employment advertisements
- Protection from unfair dismissal claims

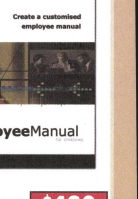


Websearch Code 151674 **$235**

MAUS Employee Manual

Create a handbook encompassing all of your organisations policies and procedures. The application covers issues such as holiday entitlements, employee benefits, employment contracts, recruitment, termination and much more through a simple to use question and answer format.

Whether your business is large or small, MAUS Employee Manual can help you achieve the kind of professional results you would expect from experienced consultants - but with a lot less time, effort and money.



Websearch Code MAU011 **$169**

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Call 1300 658 600 or visit: www.mav.com.au
All prices may change due to the daily fluctuations and online discounts.

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Dragon Naturally Speaking 7 Standard

Simply talk to your computer and your words instantly appear. Launch programs, create, edit and format documents, and manage the desktop - all by voice! Includes headset microphone.

- **Essentials** $106

Websearch Code 186420 **$176**

Dragon Naturally Speaking 7 Preferred

After completing about 5 minutes of training, you can talk to your computer and watch your words instantly appear in virtually any Windows based application. Create Reports, spreadsheets and business letters - at up to 160 words-per-minute!

- **Preferred Upgrade (196419)** $195
- **Professional (207884)** $1,585
- **Pro Upgrade (207883)** $489

Websearch Code 197400 **$369**

Dragon Naturally Speaking 7 Mobile

Dictate documents and notes on the move. Back in the office simply plug the recorder into the PC, transfer your file and let Dragon Naturally Speaking Preferred automatically transcribe your dictation. Includes a certified digital recorder, special linking software and a high-quality headset microphone.

Websearch Code 210772 **$619**

Punch Master Landscape

9 Programs in one intuitive, easy-to-use interface. Combine real-world photos with your virtual design. With Full metric capabilities.

$115

IMSI Legacy Family Tree Premium

An entire suite of tools for creating your family tree for generations to come. Manage digital photos, scanned documents and more to quickly incorporate into your family tree.

Websearch Code 195245 **$75**

IMSI TurboCAD 9

Create, edit or view CAD drawings. Comprehensive 2D power is seamlessly integrated with superior 3D surface modeling as over 250 tools are grouped logically for quick and easy access.

- **Professional (195938)** $1039

Standard Websearch Code 196674 **$185**

IMSI ClipArt & More 2,000,000

ClipArt & More provides over 2,000,000 of the highest-quality royalty-free illustrations, photos, fonts, sounds, video and animations in a variety of categories. Includes 200,000 images on 12 CD-ROMs, 1,800,000 images online through an exclusive 1 year membership to ArtToday, plus more! Use the lightning-fast search engine to locate images.

Websearch Code 197252 **$119**

Punch Architectural 3000

This Premium Product combines 22 integrated programs into one interface. Converts 2D entities into 3D Architectural features. The most powerful from the PUNCH series. With Full metric capabilities.

$375

Websearch Code 213975

Crystal Reports 10

Standard Edition

Designed for access to data stored in personal data sources and the creation of highly formatted reports, Crystal Reports 10 Standard Edition is an intuitive solution that provides basic report design functionality off PC-based data sources.

Professional Edition

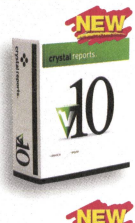
Designed for the creation and maintenance of highly formatted reports, Crystal Reports 10 Professional Edition is a high productivity solution that includes all features in the Standard Edition plus access to almost any enterprise data source. An introductory offer of Crystal Enterprise Express Edition is also included for out-of-the-box web report delivery to workgroups.

Developer Edition

Designed for easily integrating report viewing, printing and exporting capabilities into applications, Crystal Reports 10 Developer Edition provides both report design and developer tools for integrating reports into applications

Advanced Developer Edition

Designed for formatting and integrating interactive data within web applications, Crystal Reports 10 Advanced Developer Edition offers a web development and deployment bundle for integrating and deploying dynamic report creation and viewing capabilities into web applications. It includes the complete Crystal Reports feature set and an introductory offer of Crystal Enterprise Embedded Edition for offloaded report processing and runtime report creation.



Crystal Analysis 10

Crystal Analysis 10 continues to empower users of all abilities to better analyse corporate data. Through its intuitive design environment, Crystal Analysis delivers guided analysis enabling employees, customers, and suppliers to gain insight into business data and make intelligent decisions to impact corporate performance.

- **Developer Upgrade (214409)** $389
- **Advanced Developer Upgrade (214475)** $1949
- **Professional Upgrade (214477)** $325
- **Analysis Professional Upgrade** $290

Analysis Professional	Standard Edition	Professional Edition	Developer Edition	Advanced Developer Edition
$529	$225	$595	$699	$2149
	Websearch Code 214478	Websearch Code 214286	Websearch Code 214476	Websearch Code 214474

Punch Pro Home Design Suite

The total home design software solution that lets you plan every detail of your home. 12 programs in one easy to use interface. With Full metric capabilities.

- **Platinum (189479)** $199

$145

Websearch Code 213976

Punch Super Home Suite

7 Powerful Programs in one plus Ultimate Deck that launch from the same easy interface, including RealModel software that lets you build a 3D scale model of your home. With Full metric capabilities.

$125

Websearch Code 213979

StarOffice 7
By Sun Microsystems

Runs on Solaris, Linux and Windows. Read, write and edit Microsoft Office files. Applications include word processing, spreadsheets, presentations, database, drawing and graphics, web publishing and photo editing.

$175

Websearch Code 211380

Encyclopaedia Britannica 2004
Ultimate Reference Suite

With more than 100,000 articles, the Ultimate Reference Suite has more content than any other reference software! Three complete encyclopedias, two dictionaries and thesauruses, rich multimedia, a complete atlas, timelines, online mapping and more.

- **Student** (210960) **$41**
- **Deluxe** (210959) **$73**
- **Ultimate Reference DVD** (210962) **$115**

$115

Websearch Code 210961

Ipswitch WS_ FTP PRO

WS FTP Pro is the market leader in Windows-based FTP (file transfer protocol) client software. It enables users to move files between local and remote systems.

- Upload Wizard
- Auto Resume
- Custom Firewall Support with Editing Capability

$77

Websearch Code 196498

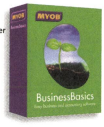
MYOB BusinessBasics

No need to jump between programs (such as spreadsheets and word processors) to get your business done. Now with MYOB BusinessBasics, you can run all your basic business tasks, create quotes, email invoices and enter transactions - from the one easy business program.

MYOB BusinessBasics is ideal for small or home-based businesses, offering you a number of significant time-saving features that make business management even easier, such as:

- Automated bank reconciliation
- An easy-entry transaction register

- **Upgrade From MYOB FirstAccounts** $59



$155

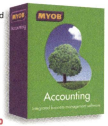
Websearch Code..... 213762

MYOB Accounting 13

MYOB Accounting is for businesses that need to streamline accounts procedures and would benefit from improved inventory management, better management of customer and supplier relationships and advanced business reporting.

- Streamline accounts procedures
- Comprehensive business management
- Powerful inventory management
- Contact management

- **Upgrade from MYOB FirstAccounts** $265
- **Upgrade From MYOB Business Basics** $290



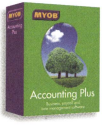
Full Version
Websearch Code 212729 $295

Upgrade
Websearch Code 196342 $219

MYOB Accounting Plus 13

MYOB Accounting Plus is for businesses that need to streamline accounts procedures and would benefit from improved inventory management, better management of customer and supplier relationships, advanced business reporting, and automated payroll or time billing.

- **Upgrade from MYOB FirstAccounts** $375
- **Upgrade from MYOB Accounting 13** $249
- **Upgrade from MYOB Accounting (Prior to 13)** $299
- **Upgrade from MYOB Business Basics** $415



Full Version
Websearch Code 212794 $515

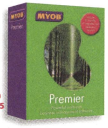
Upgrade
Websearch Code..... 196343 $265

MYOB Premier 7

MYOB Premier is for businesses that need to streamline accounts procedures, whether through simplifying complex inventory issues, running an automated payroll, time billing, accessing advanced reporting or increasing productivity with multi-user access.

MYOB Premier's combination of productivity enhancing features will appeal to any business that has complex inventory requirements. Works with more than one currency, or requires multi-user access. Also includes 1 full year of MYOB Support Licence.

- **Upgrade from MYOB FirstAccounts** $1275
- **Upgrade from MYOB Accounting** $1139
- **Upgrade from MYOB AccountingPlus** $900
- **Upgrade from MYOB Business Basics** $1315



Websearch Code 195515 $1335

MYOB FirstEdge - for Mac

MYOB FirstEdge is the basic business management software solution for small or home-based businesses using the Mac, that helps you to work faster and more efficiently.

- Create quotes that convert to invoices
- Track job costings and profitability
- Track your GST and automate your BAS
- Create and customise over 70 reports
- Email quotes, invoices and reports

- **Upgrade From MYOB FirstAccounts** $59

Websearch Code..... 194241 $159

MYOB AccountEdge 3

MYOB AccountEdge is the ideal accounting and business management software solution for businesses using the Mac.

- Maintain accurate accounts
- Process sales and purchases
- Track your inventory and your money
- Process your payroll
- Track your billable time
- Build better customer and supplier relationships

- **Upgrade from MYOB FirstAccounts** $375
- **Upgrade from MYOB Accounting** $299
- **Upgrade from MYOB AccountingPlus** $299
- **Upgrade From MYOB FirstEdge** $415

Websearch Code 196352 $529

MYOB RetailManager Standard

The complete retail picture. With MYOB RetailManager Standard it's easy to keep track of every transaction in your store from sales, stock movements, GST and gross profit, right through to staff actions and even customer details.

- Process sales fast
- Build powerful customer relationships
- Produce reports at point-of-sale
- Streamline your stocktaking
- Manage your stock

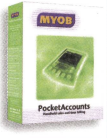
- **Retail Manager Pro** (192166) **$2175**

Websearch Code 210853 $1735

MYOB Pocket Accounts

MYOB PocketAccounts, a handheld sales and time billing program that helps businesses with a mobile sales or consulting force improve their efficiency and cash flow.

MYOB PocketAccounts runs on a Palm OS device and links seamlessly with MYOB accounting software on the desktop, allowing users to synchronise their entire day's data at the push of a button.



Websearch Code 212481 $195

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fluctuations and online discounts.

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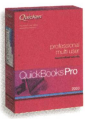


Quicken QuickBooks Pro 2003

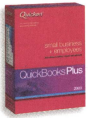
Professional Multi user

Timesaving features and powerful functionality makes QuickBooks Pro 2003 a must-have for efficiency-minded businesses. Features electronic banking, stock assembly (finished goods) tracking, units of measure, sales order/back order tracking, multiple quotes per job, variance tracking on quotes, receipt spanning over multiple jobs, brand new integrated payroll module, bank reconciliation control - allowing you to reprint by any bank record date, and much more.

*FREE Telephone support for 12 months
*FREE Upgrades for 12 months

And more exclusive benefits as part of the Quicken Advantage Program. *Offer available for Full versions only. Offer excludes Upgrades and Subscriptions.

Full Version	Upgrade	Subscription
Websearch Code 208454	Websearch Code 195486	Websearch Code 195489
$1299	$619	$449



Quicken QuickBooks Plus 2003

Small Business + Employees

QuickBooks Plus is designed for businesses that track payroll and is recommended by Accountants everywhere. Features fully integrated Payroll now contained wholly within QuickBooks, payslip and cheque printing directly from QuickBooks Plus, electronic direct deposits of pay cheques, detailed reports and payment summaries, and more. QuickBooks Plus gives you the ability to take care of all your payroll and financial information in the one program and customise the interface the way you want it.

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*FREE Upgrades for 12 months

And more exclusive benefits as part of the Quicken Advantage Program. *Offer available for Full versions only. Offer excludes Upgrades and Subscriptions.

Full Version	Upgrade	Subscription
Websearch Code 211526	Websearch Code 195485	Websearch Code 195488
$584	$295	$222

Quicken QuickBooks 2003

Small Business

QuickBooks 2003 - designed for business and recommended by Accountants. Now even easier to track the GST. QuickBooks has been designed specifically for small business with improved easier-to-use help whenever you need it. It's easy to set up and easy to navigate, with over 100 reports and graphs, plus the ability to customise your own. QuickBooks lets you bank online, automatically create budgets and work with them in an easy spreadsheet format, plus much more.

*FREE Telephone support for 12 months
*FREE Upgrades for 12 months

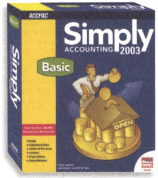
And more exclusive benefits as part of the Quicken Advantage Program. *Offer available for Full versions only. Offer excludes Upgrades and Subscriptions.

Full Version	Upgrade	Subscription
Websearch Code 209852	Websearch Code 195478	Websearch Code 195487
$445	$235	$179

AccPac Simply Accounting 2003 Basic

Simply Accounting 2003 Basic provides you with all the standard tools you need to manage your business, PLUS:

- Intuitive Installation Wizard to help you get up and running quickly
- An unlimited number of entities so you can manage your business and personal finances
- More than 100 standard reports and a customisable reports writer – comes with Crystal Reports® (incl. FREE) – so you can understand your business
- Dual currency capability that allows you to buy and sell foreign products and services
- Tracks and records GST and facilitates stress free BAS preparation
- Separate buying, stocking and selling units of sale for total inventory management
- Complies with Australian Accounting Standards, generates full audit trails with unique transaction entry numbers



AccPac Simply Accounting 2003 Pro

Simply Accounting 2003 Pro includes all the features of Simply Accounting 2003 Basic, plus additional functionality that allows you to:

- Trade in an unlimited number of currencies – multicurrency ready
- Track and manage your time spent on different activities including actual, billable and non-billable by minutes and hours
- Charge clients based on billable time or a flat fee
- Manage your cost and revenue by department
- Create bill of materials for product builds – allows you to build products from multiple inventory items as required
- Keep company financial data indefinitely - stores up to 100 years of data

Simply Accounting is an internationally recognised, award winning package. First released in 1985, Simply Accounting now has more than 360,000 users worldwide.

Sell online with Simply Webstore
Free with Simply Accounting Basic & Pro

Basic	Pro
Websearch Code 214154	Websearch Code 214155
$115	$199

Extensis Portfolio 6.1

Portfolio is the perfect tool for tracking, organising and distributing digital photos and other image files. Transform your chaotic jumble of digital files into a fully searchable catalog in minutes.

Mac OS X Compatible

Portfolio 6.1	
Websearch WIN	207083
Websearch MAC	189580
$333	

Extensis Suitcase X1 for Mac OS X

With unmatched font preview options, auto-activation, corrupt font detection and repair, duplicate font management and more. An integral part of the creative workflow.

- **Academic** (211119) **$99**
- **Upgrade** (211120) **$85**

Mac OS X Compatible

Full
$155
Websearch Code 211070

Extensis Photo Imaging Suite

A collection of image and workflow-enhancement tools for the professional and aspiring photographer. The Suite enables today's photographers to digitally catalog and distribute their work, as well as quickly and intuitively scale, mask, enhance and add border effects to images in Adobe Photoshop.

SAVE over $1,000 OFF RRP

Photo Imaging Suite	
Websearch Code	211417
$739	

WinZip 8

The archive utility for Windows and the ultimate companion for Internet downloading. Zipping safely compresses the data in your files, so that your files then occupy less space, allowing you send and save more! Multi-user licenses available. Picture used for illustration purposes only.

$88
Websearch Code 190595

Red Hat Linux 9 Personal

Offers everything needed for a personal productivity workstation, from installation through system maintenance.

$62
Websearch Code 196607

Executive Software Diskeeper 8.0

Maximize and maintain system performance automatically. The only way to maximize system speed is to eliminate fragmentation entirely - something that a manual defragmenter simply can't do.

- **Home Edition (210358) $65**

Professional Edition
$119
Websearch..... 210359

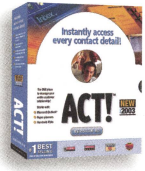
ACT! 6

The best selling contact manager. Manage information in ACT!—then have it appear in Microsoft Outlook, Palm OS or Pocket PC handhelds on the Web, or in your paper planner. That's the power of ACT!—the ONE place where you can manage every detail of your customer relationship.

- Schedule unlimited calls, meetings and to-do items.
- Create and send personalised letters, faxes, and html e-mails.
- Manage your sales pipeline with forecasting tools and built-in reports.
- Share complete customer information with other staff members in your office.
- Easily synchronise your information to your Palm OS or Pocket PC* device.
- Intergrates with popular accounting software* such as MYOB Accounting, QuickBooks and Sage Line 50/ 100
- Integrates with Microsoft Word and Excel and Outlook

Pocket PC and Accounting Integration software sold separately.

- **Single User Academic (194634) $127**
- **6 User Academic (209191) $635**



Upgrade
Websearch Code 191375
$139

ACT Single User
Websearch Code 191376
$229

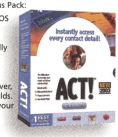
ACT 6 Pack
Websearch Code 191374
$1175

ACT! 6.0, Palm OS and Pocket PC Bonus Pack

The latest product to hit the ACT! product range is the ACT!, Palm OS and Pocket PC Bonus Pack:

- Now you can by ACT!, ACT! for Palm OS and the ACT! Link for Pocket PC all in one package
- ACT! v6.0- the best selling, user friendly contact manager on the market!
- ACT! for Palm OS- Have complete customer information with you on-the-go. ACT! for Palm OS is the first-ever, complete contact for Palm OS handhelds.
- ACT! Link for Pocket PC- synchronise your contacts and appointments to your Pocket PC handheld.

- **ACT! 6.0, Palm OS (194991) $69**



Websearch Code 214322
$249

ACT! For Web

ACT! also has a web version that is powerful and easy-to-use. ACT! for Web is a contact manager for the web, designed for corporate users and workgroups.

- Remote ACT! for Web users can share realtime information with other users back in the office.
- Administrators can easily customise database screens without programming or HTML and assign specific security rights to individual users.

ACT For Web
Websearch Code 205441
$299

ScanSoft PaperPort 9 Pro Office

The most efficient way for everyone in your office to organize, find and share paper, PDF, and digital documents. PaperPort Pro combines the efficiency of document management, the convenience of network scanning and the power of creating PDFs, to bring a new level of productivity to your organization. A key capability within PaperPort Pro Office is its built-in support for creating PDF files from any Microsoft Windows application, without the need for additional PDF creation, editing or viewing software.

- **PaperPort 9 Deluxe (196534) $145**

Pro 9 Office
Websearch Code 196535
$275

ScanSoft OmniPage Pro 14

Turn paper documents into over 30 different PC application file formats for editing, searching and sharing with a single application. Convert paper into useable MS Office documents, turn PDF files into editable documents, create PDF files for electronic archives, automatically process images from MFPs and scanners, plus more!

- **Office (213140) $799**
- **Office Upgrade (213141) $271**
- **Mac X (190055) $699**
- **Mac X Upgrade (190056) $235**

Upgrade/Crossgrade
Websearch Code 213142
$209

ScanSoft TextBridge Pro 11

Easy and accurate, entry-level OCR software, no more retyping. TextBridge Pro 11 easily turns printed pages into digital documents that can be used with your favourite Windows based application.

Reasons to consider TextBridge Pro 11:

- Never again retype originals
- Fully XP compatible
- Create web pages
- Recognises colour text
- Best entry level OCR yet

- **Full (192337) $129**

Upgrade
Websearch Code 192338
$72

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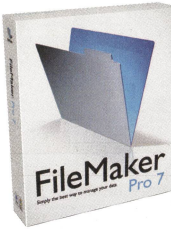
New FileMaker Pro 7



#1-selling easy-to-use database just got better!

FileMaker® Pro 7* database software is simply the fastest, easiest way to effortlessly manage people, projects, images and information. It helps you gain insights into your business so you can make more informed decisions. FileMaker Pro 7 helps you organise, manage and share all of your data regardless of file type, so you can uncover critical business information. Now you can turn your ideas into productive, creative and customised solutions that you can tailor to solve your specific business problems and share them securely with your whole workgroup.

New Features

- NEW File Management—store or link to files from any popular format including PDF, PowerPoint, Excel, Word, JPEG, and more
- NEW Multiple Views—open more than one window in your database to get multiple views of your information
- NEW Dramatically increase the capacity of your database—up to 8 terabytes (4,000 times current limit)
- NEW More accurate data entry, safer updates—confirm all record and layout changes before they are saved
- NEW Relational Model—improved relational architecture allows you to link data through a visual "map" of your database

Upgrade Today!

Limited time only

For a limited time, ALL customers who own a licence of FileMaker Pro 2.1, 3.0, 4.x, 5.x and 6 can upgrade to FileMaker Pro 7 until 17th September 2004**

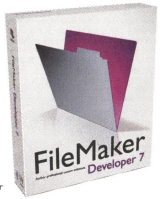
FMP7 Standard	$459
FMP7 Upgrade	$235
FMP7 5-Pk Standard	$2269
FMP7 5-Pk Upgrade	$1099

FileMaker Developer 7

Author professional custom solutions

FileMaker Developer 7 is an enhanced version of FileMaker Pro for serious database developers. It includes tools and utilities to streamline development, maintenance and to deploy professional, custom solutions.

$150 in-box rebate for FileMaker Developer 4.x, 5.x, and 6 licensed users.***



*The FileMaker 7 product family does not work with earlier versions of FileMaker products. Product specification, prices and availability are subject to change without notice.
**Offer expires on 17/9/2004 for FileMaker Pro 2.1, 3.0, 4.x, and 5.x licensed users. Go to www.filemaker.com.au/upgrade for more information. ***Offer expires on 17/9/2004 for FileMaker Developer 4.x and 5.x licensed users. Go to www.filemaker.com.au/upgrade for more information.

Centennial Media Training for FileMaker Pro 6

These Training CDs provide thorough and comprehensive training into the basic principles and features of FileMaker Pro 6. Beginners can proceed step by step with easy to understand methods and techniques.

- **Intermediate Training CDs** (208865) $199
- **Advanced Training CDs** (208866) $199

Basic Training CDs
$199
Websearch Code 208864

TypeSmart

Already well know in Australian education circles in its earlier incarnation as eText, typeSmart is a genuine breakthrough in typing technology. Incorporating the latest insights into Accelerated Learning and taking into account research into electronic keyboard use, as distinct from old-fashioned typewriters, typeSmart can take beginner or "hunt and peck" typists to 10 finger touch typing in just 6 hours.

TypeSmart justifies its tagline "Breakthrough Typing Tutor" by dispensing with the outdated Home Keys method and introducing the eText Direct Reach Method recommended by the latest research into modern typing. It is the only typing software to do so and is now established in many of Australia's leading private schools, Australia's largest provider of distance learning, Deakin University, and is now being actively promoted into the TAFE and training environments.

$75
Websearch Code 210189

Symantec AntiVirus Corporate Edition 8.1

Protects workstations and network servers with the world's bestselling and most powerful virus protection. In one easy-to-deploy, licence-in-a-box solution, it provides Symantec's award-winning technology to deliver superior value and protection from Internet-based threats including viruses, Trojan horses, malicious ActiveX code and Java applets.

- **New!** Centralised network auditing capabilities.
- **New!** Extensive platform support, now including Windows Server 2003 and Netware Secure Console.
- **New!** Supports 64-bit Intel Itanium II hardware.

5 User Pack

$399

Websearch Code 209076

Symantec FireWall VPN Appliance

Model 100 - 4 Lan and 1 Wan Ports
Provides plug and play networking, web access, and firewall and VPN security for up to 25 users.
$666
Websearch: 189887
RentSmart $7.30 p/wk

Model 200 - 8 Lan and 2 Wan Ports
Brings Firewall and VPN protection, load balancing, and high availability to offices with up to 40 users
$1369
Websearch: 189888
RentSmart $15.01 p/wk

Model 200R - 8 Lan and 2 Wan Ports
Brings Firewall and VPN protection, load balancing, and high availability to offices with up to 40 users. Also includes the Symantec VPN Client (with integrated personal firewall).
$1799
Websearch: 189889
RentSmart $19.72 p/wk

Norton Internet Security 2004

Symantec's Norton Internet Security 2004 provides essential protection from viruses, hackers, and privacy threats. Powerful yet easy to use, this award-winning suite now includes advanced spam-fighting software to filter unwanted mail out of your inbox. Protect yourself, your family, and your PC online with Norton Internet Security 2004.

Norton Internet Security 2004 includes:
- Norton AntiVirus
- Norton Personal Firewall
- Norton Privacy Control
- Norton AntiSpam
- Norton Parental Control
- **Academic** (210240) **$77**

Norton AntiVirus 2004
Norton Personal Firewall 2004
Norton AntiSpam 2004

$30 MAIL-IN UPGRADE REBATE*

***$30 MAIL-IN UPGRADE REBATE OFFER!**
For previous owners of Symantec / Norton retail packaged product or pre-loaded (OEM) or downloaded full version Symantec software. Proof of previous ownership is required. Please retain your sales receipt to submit rebate request. Offer only applies to full version retail packaged purchases of Norton Internet Security 2004. Offer is not valid in conjunction with any other rebate offer. Offer ends 31/12/2004. See box for details.

Websearch Code 210636 **$118**

Norton AntiVirus 2004

Symantec's Norton AntiVirus 2004 is the world's most trusted antivirus solution. It protects email, instant messages, and other files by automatically removing viruses, worms and Trojan horses. New built-in features also detect certain non-virus threats such as spyware and keystroke loggers. Protect your PC 24 hours a day with award-winning Norton AntiVirus.

- **5 User Pack** (210226) **$222**
- **10 User Pack** (210228) **$429**
- **1 User Academic** (210234) **$52**

Websearch Code 210225 **$77**

Norton AntiVirus Pro 2004

Symantec's Norton AntiVirus 2004 Professional is the world's most trusted antivirus solution with advanced protection. It combines award-winning virus defense with tools to help you recover important files and securely delete sensitive information. And it comes with a license for two computers, so it's perfect for home offices.

- **Academic** (210237) **$65**

2 User Licence

Websearch Code 210227 **$98**

Norton Personal Firewall 2004

Symantec's Norton Personal Firewall 2004 keeps hackers out and personal data in. It makes robust firewall protection easy by automatically hiding your PC on the Internet and blocking suspicious connections. Norton Personal Firewall also protects your privacy by preventing confidential information from being sent out without your knowledge.

- **5 User Pack** (210651) **$225**
- **10 User Pack** (210254) **$444**
- **Academic**: (210244) **$52**

Websearch Code 210644 **$77**

Norton Internet Security Pro 2004

Symantec's Norton Internet Security 2004 Professional protects you and your business from online threats. It eliminates viruses automatically, blocks hackers, safeguards your personal information, fights spam, increases online productivity, recovers lost or damaged files and thoroughly deletes confidential data you no longer need.

- **5 User Pack** (210648) **$339**
- **10 User Pack** (210253) **$666**
- **Academic** (210241) **$97**

Websearch Code 210637 **$138**

Norton SystemWorks 2004

The smartest way to solve computer problems. This easy-to-use suite includes full versions of Symantec products to defend against viruses, optimise hard disks, manage your passwords, recover from system problems and clean up after Internet sessions.
Keep your PC running at its best with Norton SystemWorks.

- **Academic** (210247) **$76**

Websearch Code 210639 **$117**

Norton SystemWorks Pro 2004

Symantec's Norton SystemWorks 2004 Professional Edition provides advanced problem-solving solutions to maximize PC performance. Includes award-winning Symantec products and valuable additional utilities to protect your PC from viruses, optimise performance, diagnose and fix problems and recover from disasters.

- **5 User Pro** (210649) **$345**
- **10 User Pro** (210255) **$677**
- **Academic** (210248) **$90**

Websearch Code 210648 **$137**

Norton AntiSpam 2004

Symantec's Norton AntiSpam 2004 filters unwanted email out of your inbox. Working with any POP3 email program, it filters incoming mail on multiple levels, detecting and flagging unsolicited messages while promptly delivering valid mail. To make your online time more enjoyable, Norton AntiSpam also blocks intrusive pop-up and banner ads.

- **5 User** (210650) **$183**
- **10 User** (210252) **$359**
- **Academic** (210238) **$44**

Websearch Code 210645 **$63**

Norton Password Manager 2004

Norton Password Manager records user names, passwords, credit card numbers, and other confidential information into an encrypted file that only you can access. Then it automatically offers to insert the appropriate data whenever you run a password-protected application (such as your email program) or visit a secure Web site.

- **Academic** (210251) **$44**

Websearch Code 210647 **$62**

Symantec pcAnywhere 11.0

Combines secure, industry-leading remote control with remote management and advanced file transfer to help IT personnel quickly resolve helpdesk and server support problems. Offers comprehensive security, including support for 13 authentication types. Advanced security with 13 different authentication methods including RSA SecurID protects against unauthorised access to enterprise resources.

- **5 User** (197448) **$525**
- **Host Only** (197447) **$159**
- **Academic** (197449) **$165**

pcAnywhere 11.0 host & remote
Websearch Code 197446 **$245**

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as prices may change due to the daily
fluctuations and online discounts.

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For Dummies Range

The popular For Dummies series has finally come to your computer!

- **Business Cards for Dummies (209543)** $29
- **CD Covers & Labels for Dummies (209565)** $29
- **Cross Stitch for Dummies (209546)** $29
- **Home Finance for Dummies (209544)** $29
- **Invitations, Thank-You Notes & Announcements for Dummies (209547)** $29
- **MP3 for Dummies (209548)** $29
- **Photo Printing for Dummies (209549)** $29
- **Typing Tutor for Dummies (209550)** $29

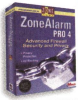
Buy one get one FREE*

*Offer via redemption through Manaccom, Conditions Apply.

Zone Alarm Pro 4

Millions of users trust their computers to Zone Labs Firewalls. The award-winning personal firewall provides home users and small business owners with the highest levels of protection possible. ZoneAlarm Pro blocks known and most unknown Internet threats and provides privacy features, such as intrusive cookie control and the ability to block annoying ads. With ZoneAlarm Pro, whenever you are connected, you are protected.

- **5 user license (211468)** $315

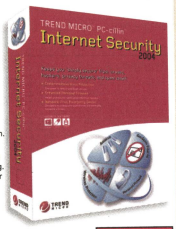


Websearch Code 212740 **$88**

Trend Micro Internet Security 2004

PC-cillin – has now graduated into the best all-round Internet Security solution available! Trend Micro Damage Cleanup Services are triggered as soon as a virus is caught to keep your system functioning properly. Includes total security against viruses, Spam, hackers and worm viruses (full featured Firewall), and spyware. Provide security for your children (Parental Control) and for your PDA.

- **Anti Virus**
  Comprehensive virus protection designed to detect and block viruses. Consumers now get the same level of protection as big corporations.
- **Personal Firewall**
  Helps prevent intrusion attempts from hackers
- **Protection for PDA**
  Includes wireless protection for Palm, Pocket PC.
- **NEW Anti Spam**
  Users can now configure Trend Micro Internet Security to identify and block unsolicited and junk emails.
- **NEW Parental Controls**
  Manage the sites your family can view with Parental Control. You can block or allow connections to web sites you deem appropriate.
- **NEW Privacy Protection**
  Helps prevent 3rd parties from monitoring your Internet use and blocks malicious programs and Web sites from accessing your personal information.
- **NEW Spyware removal**
  This is designed to detect and remove annoying Spyware programs from tracking your surfing behaviors, stealing passwords or account information.
- **12 Months updates.**
  Early warning service, is designed to inform you in advance when a serious virus outbreak is occurring. You are automatically prompted to update so your computer is protected from infection of the latest threats.
- **Academic (212711)** $62
- **5 user license (213397)** $249



2 User Websearch Code 213396 **$109**

Single User Websearch Code 211506 **$81**

McAfee VirusScan 2004

McAfee VirusScan 2004 is an easy-to-use antivirus solution that ensures your PC is protected from viruses, worms, Trojans, spyware, web dialers, and other malicious threats. McAfee VirusScan 2004 stops threats coming from email, instant messaging, Internet downloads, shared files and more.

- **VirusScan Pro (209422)** $83

Websearch Code 209421 **$66**

McAfee Virusscan and Spamkiller Bundle

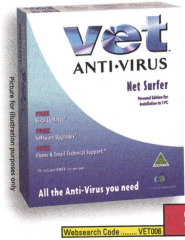
Stop viruses and keep your PC safe with McAfee VirusScan 2004. McAfee VirusScan 2004 is an easy-to-use antivirus solution that ensures your PC is protected from viruses, worms, Trojans, spyware, web dialers and other malicious threats.

Websearch Code 213115 **$99**

Vet Net Surfer Anti-Virus

Don't leave virus protection to chance - purchase Vet Net Surfer now to automatically protect your PC from viruses, worms and trojans, including those arriving via email. Vet customers receive free unlimited phone and email support, as well as daily Virus Updates and free new versions - all for one year! All the anti-virus you need.

- Now automatically checks incoming email for viruses
- Includes free, unlimited phone and email support for 1 year
- Suitable for a single home or business PC
- Independently accredited by Virus Bulletin
- 100% made and supported in Australia

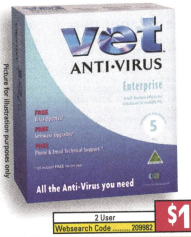


Websearch Code VET006 **$75**

Vet Enterprise Anti-Virus

Don't leave your business unprotected from viruses, worms or trojans - purchase Vet Enterprise - small business edition now to protect 2, 5, 10 or 25 PCs. Install and update across networked PCs for maximum protection. And Vet customers receive free unlimited phone and email support, as well as daily Virus Updates and free new versions - all for one year! Purchase now for peace of mind.

- Now automatically checks incoming email for viruses
- 2PC, 5PC, 10PC and 25PC versions available
- Keeps networked PCs protected from viruses automatically
- Includes free, unlimited phone and email support for 1 year
- Independently accredited by Virus Bulletin
- 100% made and supported in Australia
- **5 User (213299)** $285
- **10 User (129496)** $525



2 User Websearch Code 209982 **$125**

McAfee Internet Security Suite 2004

Destroys viruses, outwits hackers, secures your personal information, privatises your Web browsing, blocks ads and pop ups, manages your cookies and passwords, locks down your files, folders and drives, filters objectionable content, and more.

Websearch Code 209423 **$99**

Mannacom Publish PDF

Save virtually any document (from MS Word to complex graphs) in the popular Portable Document Format (PDF). A PDF file preserves the format of the original document, and contains all the original fonts, images & graphic information, layout and formatting – so what you see is exactly what everyone else sees. A PDF file can be viewed and printed from any computer running almost any operating system.

$88

Webearch Code 210633

Mannacom Publish PDF Pro

PublishPDF Pro has all the excellent features of the standard PublishPDF, but has extra security features to make it more suitable for sensitive information. Document security is increasingly important for companies the world over. PDF files, like other file formats, can be edited unless they are protected by encryption. Also included in PublishPDF Pro are other advanced features such as bookmarks and URL links.

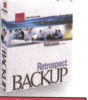
$175

Webearch Code 210634

Dantz Retrospect Pro

Retrospect protects against loss due to viruses, newly installed software, user error, damaged hardware, hardware upgrades, hackers, and lost or stolen computers.

- **Small Business Server (197430) $1285**



$229

Webearch Code 197109

Jasc Paintshop Photo Album 4

Now you can quickly and easily make the most of your digital photos. Get your photos from camera to computer in just two clicks. Then enhance, organise, and share those digital memories in a flash with Photo Album's fast and easy-to-use tools.

$85

Webearch Code 196188

Jasc PaintShop Pro 8

Not only have your favorite photo editing and graphic design tools been improved, there's a whole array of new ones. Plus, there's a brand-new integrated learning system that's easier to use than ever before.

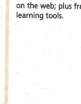
- **Upgrade (196525) $125**
- **Academic (196526) $165**

$215

Webearch Code 196309

Jasc Paint Shop Power Suite

Includes Paint Shop Pro 8 Complete photo and graphics editor; Paint Shop Photo Album Enhance, Paint Shop Xtras Edition 1 and 2 - Ready-to-use artistic resources; Animation Shop - GIF animation on the web; plus free learning tools.

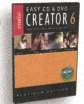


$249

Webearch Code 212742

Roxio Easy CD & DVD Creator 6

Rip, play, edit, organise and burn your digital music with new AudioCentral. Preserve memories in electronic albums, create photo slide shows, print or e-mail photos with new PhotoSuite. Make DVD movies with professional transitions and animated menus to play on your home DVD player with new DVD Builder.



$115

Webearch Code 194992

Roxio Toast 6 Titanium

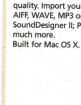
Toast 6 Titanium, the newest and fastest version of Roxio's award winning CD/DVD burning software, is the foundation of your digital life. Toast helps you do even more with iTunes, iPhoto, and iMovie. Now it's easier than ever to make the most of your data, music, photos, and video. Don't Burn It. Toast It.

$132

Webearch Code 210126

Roxio Toast with Jam

Delivers the full CD and DVD burning power of Toast plus pro audio CD editing and mastering for Mac. Record your world to CD or DVD - your audio, video, photos and data. Produce commercial CDs and demos with impeccable quality. Import your favorite file formats like AIFF, WAVE, MP3 or SoundDesigner II; Plus much more. Built for Mac OS X.



$285

Webearch Code 190313

Roxio Photosuite 5 Platinum

PhotoSuite 5 Platinum makes photo editing simple and fun with automated tasks, professional-level editing tools, creative projects and Easy CD Creator burning technology all integrated into one program. Step-by-step instructions allow you to immediately begin importing, organising, archiving, editing and sharing photos with family and friends on CD or Video CD.

$95

Webearch Code 196890

Roxio VideoWave

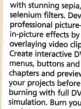
Create your DVD movie in minutes with Roxio VideoWave Movie Creator! Automatically transform your video and favorite song into a compelling movie with introductions, transitions, titles and effects. And if you want more control, our easy editing tools empower you to quickly achieve impressive results. Burn your movie to CD or DVD and share with family and friends!

$88

Webearch Code 196891

Roxio VideoWave Power Edition

Capture video from digital or analog sources, arrange scenes in the StoryLine, then insert transitions, titles and audio. Enhance your clips with stunning sepia, black and white, mosaic, or selenium filters. Develop professional picture-in-picture effects by overlaying video clips. Create interactive DVD menus, buttons and chapters and preview your projects before burning with full DVD simulation. Burn your projects to CD or DVD or share streaming video over the Web



$135

Webearch Code 196892

Adaptec VideOh! DVD

Adaptec Video Converter DVD USB-Device Kit provides the easy way to convert analog camcorder movies digitally then create easy-to-share, long-lasting DVD or Video CD discs with your home computer. VideOh! DVD includes an external USB 2.0 MPEG-2 capture/encoder box with USB & A/V cables for simple connectivity to camcorders or other analog video device. It also includes Sonic MyDVD DVD-Video creation software for Windows, which allows you to edit, organise and burn video clips.

- **VideOh! DVD PCI (197008) $199**

USB

$235

Webearch Code 197008

Adaptec VideOh! DVD Media Center

Adaptec VideOh! DVD Media Center is a complete hardware and software solution, which includes a PAL TV tuner, MPEG-2 hardware encoder, free access to an online programming guide, as well as software for personal video recording and full-resolution DVD or video-CD creation.

- **VideOh! Media Center PCI (209179) $259**

USB

$282

Webearch Code 208344

Nero 6

All of your CD and DVD burning tasks can be managed in a breeze with Nero 6. Burning DVD video, photo, data, audio or backup Nero handles all the possibilities with ease. Included within the burning solution, you can edit audio, mix multiple audio tracks like recording studio professionals, watch VCD, SVCD and DVD movies, listen to music, design covers, optimise your drive's performance and more.

$159

Webearch Code 208992

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Pinnacle Instant Copy 8

Make copies of your DVDs and CDs faster and easier than ever. Featuring a friendly interface and revolutionary duplication technology, Pinnacle Instant Copy burns bit-for-bit CD and DVD copies at unbeatable speeds! It's the smart way to make true 1:1 copies of DVD movies, transfer DVD content to Video CDs, and backup any CD media, including data, music, and video discs.

Websearch Code 210229

$88

Pinnacle Instant CD/DVD

With drag and drop simplicity, Pinnacle Systems InstantCD/DVD software accomplishes all the tasks associated with a disc burning project. It encodes MP3 files, burns audio CDs, duplicates CDs and DVDs, backs up data, and even creates photo and video slideshows that can be viewed on practically any home DVD player.

Websearch Code 210230

$139

Pinnacle Instant Video Album

Preserve and share all of your taped home videos onto DVD with Pinnacle Instant VideoAlbum. Instant VideoAlbum is designed to provide the highest quality results with the lowest possible learning curve. The software includes tools for trimming unwanted video and improving poorly lit shots.

Websearch Code 211290

$88

ACDSee Deluxe 6

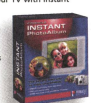
ACDSee digital photo software makes it easy to import, view, organise, print, enhance, share and archive your digital photos. ACDSee is easy to use for everyone from beginner to professional level and also powerful and flexible enough to meet your needs as your image collection grows.

Websearch Code 211068

$88

Pinnacle Instant Photo Album

Quickly organise your digital photos and video clips into interactive, high-resolution slideshows, burn them onto CD or DVD and watch them on your TV with Instant PhotosAlbum. Instant PhotoAlbum quickly turns your photos into exciting productions that you can share and enjoy with friends and family for years to come.



Websearch Code 211291

$63

Steinberg Clean 5

Clean up those dirty, poorly compressed recordings with Steinberg CLEAN, the all-in-one audio restoration and CD burning solution. Developed by Steinberg, CLEAN breathes new life into your vintage vinyl, old cassettes and questionable MP3 files.

Websearch Code 211392

$85

Steinberg Clean Plus 5

Steinberg Clean Plus uses today's leading-edge audio restoration technologies to remove unwanted pops, clicks, hiss, and hum from your old vinyl LPs and cassettes, leaving your tracks sounding as good as the day you bought them. It's the perfect tool for archiving and preserving your entire music library.

Includes PRE-AMP

Websearch Code 211391

$215

ACDSee PowerPack Deluxe 6

Includes:

ACDSee 6.0 Deluxe - Your Digital Photo Software and Picture Viewer

ACD FotoCanvas - Your Easy and Affordable Photo Editor

ACD FotoSlate - Your Fast and Creative Photo Printing Software

Websearch Code 211505

$135

Steinberg Cubasis VST 5

Create original compositions like the pros quickly and easily with STEINBERG CUBASIS VST version 5. The software features up to 48 audio channels, 64 MIDI tracks, a professional mixer with real-time effects and a huge variety of virtual instruments. Compose songs, edit sounds, print your scores and burn CDs with surround sound.

Websearch Code 214687

$215

Ulead PhotoImpact XL

PhotoImpact XL gives you the most innovative image editing tools for the PC. Edit, manage and share digital photos, plus so much more. More digital photography tools, more filters and effects, more content and more learning resources. It's everything you need to produce professional results fast.

- **Upgrade (210124)** $105

Websearch Code 210123

$168

Ulead DVD Workshop 2

Powerful authoring software for producing professional DVDs. The logical workflow and design-oriented approach guides you through the layout functions, to create dynamic navigation menus, customize background and button behavior, and add multiple subtitle and audio tracks including AC-3 audio. Preview in real-time, and output to most formats, including DLT or DVD-9.

- **Upgrade (214698)** $425
- **Academic (214699)** $425

Websearch Code 214697

$875

ACDSee Photo Master Suite

ACDSee Photo Master Suite combines Corel PHOTO-PAINT 11 photo editing software, with ACD FotoSlate† 2.0 printing software and ACD mPower Tools† multimedia software. Fix photos fast and create amazing graphics for print and web. Print professional-quality photos in three easy steps. Organise and find files easily.

Includes full version of Corel PhotoPaint 11

Websearch Code 209556

$169

Ulead DVD Picture Show 2

Ulead DVD PictureShowT Digital Camera Suite is the ideal companion for your digital camera, combining two powerful programs for managing your photos and creating exciting multimedia slideshows. You can use your photos along with your CD or DVD burner to create exciting photo & multimedia slideshows that play on your DVD player. Includes new PhotoExplorer 8.

- **Upgrade (197228)** $77

Websearch Code 193934

$95

Ulead DVD Movie Factory 3

Ulead DVD MovieFactory 3 Disc Creator is a whole new world of CD and DVD making. Burn movies, slideshows, data and music to CD or DVD in an instant. Create one-of-a-kind DVD movies with over 10,000 menu style combinations. Make CD and DVD creation fun and simple.

- **Upgrade (214049)** $149
- **Academic (214050)** $149

Websearch Code 214048

$179

Ulead Video Studio 7

Grab DVD-ready video straight from your DVD/8 camcorder with easy MPEG-DirectT capture. Trim video, add your own soundtrack, create compelling titles and drop in stunning effects using an easy-to-learn interface that makes editing fun. Share finished movies on tape, e-mail, the Web and even burn your own high-quality VCDs, SVCDs and DVDs.

- **Upgrade (195166)** $96

Websearch Code 195070

$175

Trellian eComm Store

With eComm, you can take orders 24 hours, 7 days a week, complete with secure order management and credit card processing (additional charges may apply). Secure online transactions and order management, build a detailed product database - images, freight, descriptions and more.

$44
Websearch Code 130908

Trellian Jack the MP3 Ripper

An efficient ripping tool that enables the user to extract audio from a CD and export the music into either .mp3 or .wav format.

- Encodes to MP3 or WAV
- Full editing and saving of MP3 format Title/Artist/Trackname IDTAG information
- Requesting of Title/Artist/Trackname data over the Internet

$55
Websearch Code 190113

Trellian SubmitWolf

Register your pages with over 1000 search engines and Directories in minutes. Post your links to over 500,000 link pages. Submit as many of your URLs as you like at no additional cost. 48 Hour, Priority Paid Submission on MSN, AOL, HotBot, GOTO, iWon, AltaVista, Slider.com and other sites part of the Inktomi network.

$125
Websearch Code 130006

Adobe Creative Suite Standard & Premium

The Adobe Creative Suite (CS) is an integrated design environment that combines the most complete upgrade in Adobe's history - featuring full, new versions of the tools you rely on most for image editing, illustration, page layout, and cross-media output - with innovative Version Cue file-management features, a smooth Adobe Portable Document Format (PDF) workflow and comprehensive design resources. Create and publish content for print and the Web faster and more easily than ever before, all at an outstanding value. Adobe integration makes it possible. The Adobe Creative Suite makes it affordable.

CS Standard Includes:
- Adobe Photoshop CS
- Adobe Illustrator CS
- Adobe Indesign CS
- Version Cue
- Training CD

Upgrade from Photoshop	
Websearch WIN 211059	$975
Websearch MAC 211058	
Full	
Websearch WIN 211054	$1599
Websearch MAC 210758	

CS Premium Includes:
- Adobe Photoshop CS
- Adobe Illustrator CS
- Adobe Indesign CS
- Adobe GoLive CS
- Adobe Acrobat Professional
- Version Cue
- Training CD

- **Premium Academic** $575

Upgrade from Photoshop	
Websearch WIN 212518	$1299
Websearch MAC 211061	
Full	
Websearch WIN 210671	$1999
Websearch MAC 210757	

Adobe Photoshop CS

Get superior results faster with industry-standard Adobe Photoshop CS software and its integrated Web production application, Adobe ImageReady CS software. Graphic and Web designers, photographers, and video professionals can take advantage of indispensable features that include improved file management, new design possibilities, a more intuitive way to create for the Web, and support for 16-bit images, digital camera raw data, and non-square pixels. Now you can create the highest quality images more efficiently than ever before.

- **Upgrade** $359
- **Academic** $449

Full	
Websearch WIN 210744	$1098
Websearch MAC 210743	

Adobe Illustrator CS

Adobe Illustrator CS is an essential tool for anyone who needs to express ideas visually in print, on the Web, and in any other medium. Powerful new features, including 3D graphics effects, character and paragraph styles, and innovative text composition controls, deliver indispensable design options to help you explore your creative vision.
And enhanced support for Adobe Portable Document Format (PDF), expanded print capabilities, faster performance, and tight integration with other Adobe products as well as Microsoft Office make it easier than ever to efficiently publish your artwork anywhere.

- **Upgrade** $359
- **Academic** $149

Full	
Websearch WIN 210747	$899
Websearch MAC 210748	

Adobe InDesign CS

Adobe InDesign combines extraordinary production power and creative freedom to take page design to a new level. With InDesign CS, you can produce pages quickly and output them reliably. Its intuitive creative toolset helps you refine design ideas rapidly. The ability to import native Photoshop, Illustrator and Adobe Portable Document Format (PDF) files saves significant production time. Plus, InDesign, Photoshop and Illustrator software share a standard Adobe interface, so you can get up to speed quickly and work more efficiently with tightly integrated tools.

- **Upgrade** $359
- **Academic** $215

Full	
Websearch WIN 210752	$1249
Websearch MAC 210751	

Adobe InDesign CS PageMaker Edition

Adobe InDesign CS PageMaker Edition software combines the full version of InDesign CS with the Adobe PageMaker Plug-in Pack to provide an exclusive upgrade path from PageMaker. Popular PageMaker tools ease the transition to InDesign. Professionally designed templates introduce you to the advanced layout capabilities of InDesign. And extensive training materials help you master InDesign quickly. What-ever you use PageMaker for now, you can build on your experience to hit the ground running with InDesign.

$675

Adobe GoLive CS

Adobe GoLive CS delivers what you need to create professional Web sites. Work with Adobe Photoshop, Adobe Illustrator, and Adobe Portable Document Format (PDF) files directly within GoLive without switching between applications. Share Adobe InDesign files for true cross-media publishing across multiple devices. Maximize your productivity with a creative Web design environment that suits your style. Design without compromise using powerful tools that support industry standards, including world standards for mobile and handheld devices.

- **Upgrade** $359
- **Academic** $119

Full	
Websearch WIN 210755	$625
Websearch MAC 210756	

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fluctuations and online discounts.

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Adobe Acrobat 6.0 Standard

Streamline business document exchange and review. Enables business professionals to easily convert any electronic or paper document - even a Web site - to a reliable Adobe Portable Document Format (PDF) file for exchange and review with colleagues and customers.

Create and exchange electronic documents

Easy Adobe PDF creation, document merge, scanning to Adobe PDF.

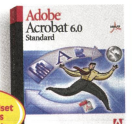
Streamline document reviews

Review management, accurate comments, comment summaries.

Protect sensitive documents

Password protection, 128-bit encryption, digital signature support.

- **Upgrade** $199
- **Academic** $135



Bonus
Logitech Headset on Upgrades
Conditions Apply
See Below

Full
Websearch WIN 196180
Websearch MAC 196179

$465

Adobe Acrobat 6.0 Professional

Advanced control over document exchange and output. Enables business, creative and engineering professionals who work with graphically complex documents to improve the reliability and efficiency of business-critical document exchange. Acrobat Professional offers all the benefits and features of Acrobat Standard and more.

Benefits for business professionals

Create and combine documents for review, streamline review management, use robust commenting tools, efficiently integrate comments, create forms, create secure, searchable archives

Benefits for engineering professionals

Create rich, layered documents, benefit from enhanced file viewing and navigation, comment using specialized tools

Benefits for creative professionals

Preflight and preview content, create rich-media Adobe PDF files, create forms, produce high-quality output

- **Upgrade** $299
- **Academic** $199

Bonus
Logitech Headset on Upgrades
Conditions Apply
See Below

Full
Websearch WIN 196182
Websearch MAC 196181

$699

Centennial Media Illustrator CS

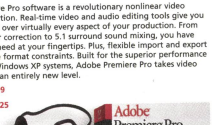
Master this versatile graphic design program with this set of training CDs. Centennial Media will take you step by step through the powerful tools and special features of Adobe Illustrator CS with easy to follow teaching techniques.

$297
Websearch Code 213183

Adobe Premiere Pro

Adobe Premiere Pro software is a revolutionary nonlinear video editing application. Real-time video and audio editing tools give you precise control over virtually every aspect of your production. From advanced color correction to 5.1 surround sound mixing, you have the tools you need at your fingertips. Plus, flexible import and export options reduce format constraints. Built for the superior performance of Microsoft Windows XP systems, Adobe Premiere Pro takes video production to an entirely new level.

- **Upgrade** $399
- **Academic** $325



Bonus
Logitech Internet Chat Headset available on all Upgrades.
Redeemable through Adobe Customer Service (1300 550 205) From 1st March 2004 to 9th April 2004. Conditions Apply

Full
Websearch WIN 211389

$999

Adobe Video Collection Pro

The Adobe Video Collection Professional edition delivers powerful, integrated tools for Windows based video production. Prepare layered images for video with Adobe Photoshop. Transform video into compelling stories with Adobe Premiere Pro. Create visual effects for the most demanding production environments with Adobe After Effects Professional. Author interactive, multi-language DVDs with all-new Adobe Encore DVD. Enhance all of your productions with multitrack audio accompaniments created using the professional tools in Adobe Audition. The Adobe Video Collection pairs creative control with the ability to deliver professional results for film, video, DVD or the Web.

Includes:

- Adobe Premiere Pro
- Adobe Photoshop
- Adobe After Effects
- Adobe Encore DVD
- Adobe Audition

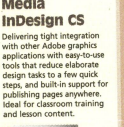
- **Academic** $1149

Full
Websearch WIN 211057

$2549

Centennial Media InDesign CS

Delivering tight integration with other Adobe graphics applications with easy-to-use tools that reduce elaborate design tasks to a few quick steps, and built-in support for publishing pages anywhere. Ideal for classroom training and lesson content.



$199
Websearch Code 213184

Adobe Photoshop Album 2.0

Finding and organising your digital photos is a snap with Photoshop Album. Now you can see all of your pictures in one convenient place. Instantly sort them by date or use keywords to organize photos by people, places, events or any other subject you choose. Easily import your photos from your digital camera with one click. Quickly fix common photo problems with the Single Click Fix button, eliminate red eye or crop out unwanted areas of your photos.

$77
Websearch Code 211248

Adobe Photoshop Elements 2.0

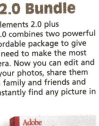
The perfect combination of power and simplicity so you can do more with your photos. From quickly correcting red eye, color and exposure to more creative editing, you can easily achieve outstanding results. Comprehensive Help features offer easy-to-understand explanations, definitions of terminology, hints for using editing tools and more. Inspirational Recipes describe how to apply amazing special effects and help you perform a variety of editing techniques.

- **Academic** $81

$139
Websearch Code 191428

Adobe Photoshop Album & Photoshop Elements 2.0 Bundle

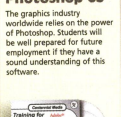
Adobe Photoshop Elements 2.0 plus Photoshop Album 2.0 combines two powerful products in one affordable package to give you everything you need to make the most of your digital camera. Now you can edit and creatively enhance your photos, share them countless ways with family and friends and always be able to instantly find any picture in your collection.



$167
Websearch Code 212490

Centennial Media Photoshop CS

The graphics industry worldwide relies on the power of Photoshop. Students will be well prepared for future employment if they have a sound understanding of this software.



$363
Websearch Code 213181

Norton AntiVirus Version 9 Mac

Works automatically in the background to find and remove viruses - without interrupting your work. It even detects viruses in email and Internet files while they are being downloaded to your computer.

- **Academic (197250) $65**

$99

Webesearch Code 197242

Norton Systemworks 3 Mac

Contains all the great programs including:

- Norton Antivirus
- Norton Utilities
- Dantz Retrospect Express Backup
- Aladdin Spring Clean
- **Academic (197247) $94**

$151

Webesearch Code 210344

Norton Internet Security 3 Mac

The essential protection from viruses, hackers and privacy threats:

- Norton Antivirus
- Norton Personal Firewall
- Norton Privacy Control
- Norton Parental Control
- Aladdin iClean
- Academic (197246) $88

$135

Webesearch Code 197245

CorelDRAW Graphics Suite 12

Get it right the first time with CorelDRAW Graphics Suite 12!

Includes:

- CorelDRAW 12
- Corel PHOTO-PAINT 12
- Corel R.A.V.E. 3
- FREE Lynda.com 2 hour multimedia training CD

With new smart design tools, it's now easier and faster to produce more creative and accurate shapes and objects—giving you a more powerful Windows graphics suite. Discover new and advanced features that increase productivity, such as real-time visual feedback.

Keep your workflow smooth with industry-standard file compatibility, including SVG, AutoCAD, HPGL, Adobe Photoshop, Adobe Illustrator, PDF, and new Microsoft Office export. With integrated applications for vector drawing, page layout, digital imaging and motion graphics all in one box, CorelDRAW Graphics Suite 12 offers value that's second to none.

- Time-saving enhancements help you meet important deadlines
- Improved file compatibility streamlines your workflow
- One comprehensive suite gives you outstanding value
- **Academic (213941) $199**

FREE Lynda.com 2 hour multimedia training CD

Upgrade
Webesearch Code 213940 **$299**

Full
Webesearch Code 213938 **$635**

Corel Painter 8

Corel Painter 8 lets you experiment with the widest range of Natural-Media tools available today. Expand your digital painting technique with a portfolio of new features, including a Mixing Palette that realistically mimics the traditional paint mixing experience, digital Watercolour and Sketch effect, more than 325 new brushes, and a Brush Creator for limitless customisation.

- **Upgrade (196513) $235**
- **Academic (209941) $168**

Webesearch Code 196514 **$479**

CorelDRAW Essentials 2

A simple-to-use, all-in-one drawing application, with powerful photo-enhancement tools and customisable template capabilities that allow you to create professional-looking projects with ease. You can produce sophisticated graphics, correct and enhance photos, lay out your project and publish it in a variety of print and Web formats.

Webesearch Code 209094 **$129**

Corel KPT Collection

The Corel KPT Collection of Kai's Power Tools plug-in filters gives professional designers an unprecedented set of creative tools. A natural addition to Adobe Photoshop , it dramatically extends the boundaries of image editing. KPT Fluid lets you create and animate a variety of distortions. KPT Ink Dropper creates liquids from water spots to smoky swirls. And KPT Lightning produces extremely realistic lightning effects. The whole collection makes a significant impact on your creativity and productivity.

Webesearch Code 198908 **$169**

Corel Photobook

Corel Photobook is the perfect companion for all your digital camera needs. Fast, fun and easy to use, it lets you retouch, organise and share your digital photos with the click of a mouse. Enhance your pictures, create personalised photo albums and organise your photos more easily than you ever imagined. Plus, print photos, publish them to the Web, create slide shows or e-mail them to friends and family. Corel Photobook—perfect digital photos made easy!

Webesearch Code 197494 **$66**

Corel Print House 6

A comprehensive and easy-to-use home publishing suite that lets you create fun print projects quickly, easily and with a high degree of creativity, including scrapbooks, greeting cards, calendars, banners, paper toys, invitations and more. A complete publishing package at your fingertips, with an enormous selection of and drawing tools, ready made sample projects and graphics, and simple features that make it easier than ever to publish your projects on the Web, or e-mail them to friends and family.

Webesearch Code 197492 **$55**

Corel Bryce 5

Create 3D landscapes and animations with Corel Bryce 5. Striking an optimum balance between power and ease of use, this innovative software is an ideal way to integrate 3D technology into your creative process. Smooth network rendering saves valuable time by letting you render images on multiple computers. A new Light Lab gives you robust control over lighting direction, and the new Tree Lab ensures a more accurate depiction of real-world environments.

Webesearch Code 196909 **$145**

Corel R.A.V.E. 2

Based on award-winning CorelDRAW technology, Corel R.A.V.E. 2 gives first-time or novice animators the power to create, customize and add Web animations quickly and simply. Intuitive, adaptable and easy-to- use, Corel R.A.V.E. 2 gives you all the capabilities you need, without any of the complications you don't.

Webesearch Code 197493 **$66**

WordPerfect Family Pack 5

Do more with your home computer than you ever thought possible, with WordPerfect Family Pack 5. Manage household finances. Create polished school reports, letters and recreational projects. Enhance your digital photos and share them on the Web. This suite offers all the software your family needs at one great price!

Webesearch Code 209095 **$119**

WordPerfect Office 11

WordPerfect Office 11 is a different kind of productivity suite. It's not just innovative, it's intelligent. The way it responds to your needs, extends beyond your desktop, and integrates with the tools and technologies you use every day—this type of intelligence is essential to how you create, exchange and interact with content. From Microsoft Office compatibility, to XML integration, to PDF publishing, WordPerfect Office 11 improves your overall efficiency. It's the intelligent choice.

- **Upgrade (196505) $125**
- **Academic (211074) $119**

Webesearch Code 197308 **$179**

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All prices may change due to the daily fluctuations and online discounts.

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Macromedia Studio MX 2004

Macromedia Studio MX 2004 integrates the leading professional tools for developing the full range of web sites and internet applications. Developers can build websites and applications with Dreamweaver, create interactive content with Flash, generate web graphics with Fireworks, and incorporate vector graphics with FreeHand. The consistent user interface and seamless integration across the tools in Studio MX 2004 streamline web development workflow, enhancing productivity and ease-of-use. For developers delivering rich interactive applications, Studio MX 2004 is also available with Flash Professional.

- **Academic (209828)** $267
- **Upgrade from MX (210076)** $665
- **Upgrade from any Macromedia product (210075)** $785

Full
Websearch WIN/MAC...209214

$1398

Macromedia Dreamweaver MX 2004

Dreamweaver MX 2004 is the professional choice for building web sites and applications. It provides a powerful combination of visual layout tools, application development features, and code editing support, enabling developers and designers at every skill level to create visually appealing, standards-based sites and applications quickly. From leading support for CSS-based design to hand-coding features, Dreamweaver provides the tools professionals need in an integrated, streamlined environment. Developers can use Dreamweaver with the server technology of their choice to build powerful Internet applications that connect users to databases, web services, and legacy systems.

- **Academic (210081)** $165
- **Upgrade (210066)** $315

Full
Websearch WIN/MAC...209265

$665

Centennial Media Training CD-ROM's

Centennial Media provides the solution through interactive CD computer training of the highest standard that is also convenient, flexible and extremely cost-effective.

DreamWeaver MX 2004

$363

Websearch Code 213372

FireWorks MX 2004

$297

Websearch Code 213373

Flash MX 2004

$297

Websearch Code 213371

Macromedia Flash MX Pro 2004

Improved rich media support, streamlined publishing and robust new features to jumpstart development of highly interactive experiences plus advanced functions for creating data-driven applications, interactive content, professional quality video experiences, and deployment to mobile phones and devices. Macromedia Flash MX Pro is contained in Macromedia Studio MX 2004 Pro.

- **Academic (209224)** $239
- **Upgrade (210072)** $499
- **Standard (209209)** $799
- **Standard Upgrade (210070)** $329
- **Standard Academic (209223)** $165

Full
Websearch WIN/MAC...210071

$1139

Macromedia Director MX 2004

Author once and deploy anywhere with Director MX 2004, the proven multimedia tool for building rich, interactive content and applications for CDs, DVDs, kiosks, and the Internet. Director MX 2004 handles the widest variety of media, letting you build compelling, high-performance content—such as learning applications, corporate demonstrations, and games—that delivers measurable results.

- **Academic (214565)** $785
- **Upgrade (214094)** $625

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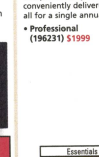
Macromedia Fireworks MX 2004

Create, optimise and integrate great-looking web graphics. Fireworks MX 2004 provides professional control that enables easy creation of sophisticated rollover effects, multi-state buttons and pop-up menus. Fireworks MX 2004 streamlines productivity with enhanced performance and third-party web development tools.



- **Academic (210082)** $165
- **Upgrade (210068)** $239

Full
Websearch WIN/MAC...209207

$515

Macromedia Contribute 2

Update, add and publish content to existing websites without knowing HTML. Business users can quickly make content changes that respect existing website design, permissions, and code. This means less time spent updating web content while retaining control over their site.

- **Academic (207911)** $129
- **5 User (207909)** $635
- **10 User (207910)** $1199

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Websearch WIN/MAC...207908

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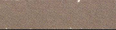
QuarkXPress 6

Much more than a page layout tool, QuarkXPress 6 provides proven performance with graphics and colour management, text processing, Web-page design, XML, output and more!

- Supports Mac OS X v10.2, Windows 2000, and Windows XP.
- Synchronise text for speed and accuracy - save time and reduce the number of data entry errors.
- Create PDF files directly from QuarkXPress without having to buy third-party software.
- **Upgrade from 4** $1199
- **Upgrade from 5** $715



QuarkXPress 6.1 Patch Now Available

Quark XPress 6

$2699

Websearch WIN 213306
Websearch MAC..... 213305

Macromedia Freehand MX

Concept and design visually-rich graphics for print and web with Macromedia FreeHand MX, the multi-publishing design solution with powerful illustration and drawing tools and an open, streamlined workflow.

- **Upgrade from 10** $165
- **Upgrade from 9** $249

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Websearch MAC..... 196299

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Macromedia DevNet

DevNet Subscriptions gives you the latest development software, Macromedia servers and productivity-enhancing resources, conveniently delivered online and on CD and all for a single annual fee.

- **Professional (196231)** $1999

Essentials
Websearch WIN ... 196296

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Macromedia ColdFusion MX 6.1

Easy connectivity to enterprise data, built-in connectivity for Flash user interfaces, integrated search and charting, and complete support for XML and web services, ColdFusion MX provides everything you need to deliver powerful applications. Available in a configuration that supports industry leading application servers.

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- **Standard Academic (209651)** $1039

Enterprise
Websearch Code ...209259

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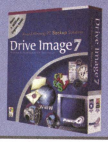

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- Make backup simple with a user-friendly Windows interface and step-by-step wizards

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$88 Academic 192339

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- **FREE** PowerQuest DataKeeper™– effortless data protection software
- New step-by-step wizards – Create Backup Partition and Install Another OS
- File Browser – browse, copy, or move files and folders from one partition to another regardless of partition type (e.g. Windows* [FAT/32, NTFS] and Linux* [Ext2, Ext3])
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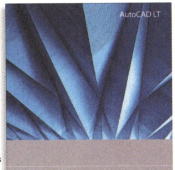
Autodesk AutoCAD LT 2005

Efficient, Secure, Affordable 2D CAD Software

AutoCAD LT 2005 is the affordable 2D CAD software that helps you create, plot, publish, and share your 2D designs. You can quickly create tables, better manage large groups of layers, and conveniently access frequently used content to work more efficiently. Sharing your data widely is a snap: even team members without AutoCAD LT software can view and mark up your published DWF files and you can instantly distribute multiple DWG files in a single step. Plus background plotting frees you to work while you print out your drawings. AutoCAD LT 2005 provides full DWG compatibility with AutoCAD 2005.



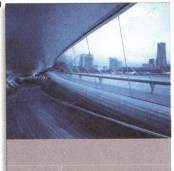
NEW

Call for Pricing

Autodesk AutoCAD 2005

Faster Data Creation, Easier Data Sharing

Creating a single drawing as efficiently as possible is important. Delivering a coordinated set of drawings in a timely manner directly benefits your bottom line. With AutoCAD 2005 you can do both. Everyday tools like the table object and tool palettes boost productivity, and the new Sheet Set Manager helps you control content across entire sets of related drawings, enabling you to lower the risk for errors. Then, in a single view, you can compose and collate sheet sets and share them with your project team using plots, eTransmit, or DWF (Design Web Format) files.



NEW

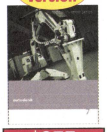
UPGRADES ALSO AVAILABLE. CALL FOR PRICING.

Call for Pricing

Manufacturing Series

- Autodesk Inventor
- Autodesk Mechanical Desktop
- AutoCAD Mechanical
- AutoCAD (included as part of AutoCAD Mechanical)

Student Version



$255

Websearch Code.....211211

Building Series

- Revit
- Autodesk Architectural Desktop
- AutoCAD (included as part of Autodesk Architectural Desktop)

Student Version

$255

Websearch Code.....211210

Civil Series

- Autodesk Land Desktop
- Autodesk Civil
- Autodesk Survey
- AutoCAD (included as part of Autodesk Land Desktop)

Student Version

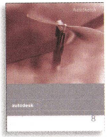
$255

Websearch Code.....198672

AutoCAD and Autodesk VIZ also available separately.

Autodesk AutoSketch 8

An affordable and easy-to-use precision drawing tool for new or occasional CAD users who need to create conceptual drawings and sketches. It provides productivity and ease of use features not found in other low cost precision drawing programs. From concept sketches, information graphics and floor layouts to presentations, electrical drawings and home project plans, you can draw it all - quickly and accurately.

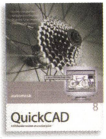


Websearch Code.....189590

$215

Autodesk QuickCAD 8

QuickCad is the most affordable design program that Autodesk offers, but its low price doesn't diminish its capabilities. It comes with plenty of productivity features that let you make technical designs and diagrams. With its short learning curve, QuickCAD lets you start drawing right away by offering a simple beginner interface, then as you grow familiar with its capabilities, you can change to advanced or expert levels.



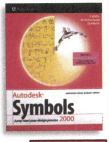
Websearch Code.....189591

$135

Autodesk Symbols 2000

Autodesk Symbols 2000 simplifies routine drawing tasks and boosts productivity through a toolbar-style graphical interface, which guides you rapidly through a wide selection of technically correct symbols. With a click of the mouse symbols are placed easily and exactly where they are needed.

Architectural Series contains over 5,600 symbols for building design and documentation. Engineering Series containing over 10,800 symbols covering all aspects of Engineering.



Architectural/Engineering Websearch.....130191/130331

$189

Autodesk Volo View 3

Using Volo View 3, team members can view, mark up, measure, print, and plot AutoCAD 2004, Autodesk Inventor 7, and raster formats as well as DWF (Design Web Format) files without having the original design creation software. The files display and print exactly as the document creator intended—with rich design information, such as layers, views, and measurements.

Websearch Code.....208826

$345

Autodesk Raster Design 2004

Now you can easily use and reuse existing design data in scanned maps, drawings, aerial photographs, and satellite imagery. Autodesk Raster Design 2004, the editing and image-processing tool that works inside your AutoCAD software–based application, can save hours of drawing time by converting raster to vector and combining drawings with real-world imagery.

Upgrades also available.

Websearch Code.....211310

$2598

Autodesk Viz 4

Award-wining Autodesk VIZ provides a fluid 3D environment for modelling, rendering and animation. Whether you're an architect, land planner or mechanical designer, you can use Autodesk VIZ throughout the design process to develop and explore concepts and alternatives, communicate design intent to clients and validate your design to ensure they're error free. Autodesk VIZ, a multimedia software tool that brings your designs alive.

Upgrades also available.

Websearch Code.....190084

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DSL broadband:
the intelligent user's choice

NEWS FLASH!

OptusNet Broadband is now available to more households than ever before.

In a move to give consumers an even greater range of options for Internet access, Optus has now added DSL broadband to its list of services. That means that OptusNet broadband is now an option for 4.1 million households. The addition of DSL to the OptusNet service will be good news to the many consumers who had sought connection to OptusNet Cable in the past, but had not been able to avail themselves of the service due to their geographical location.

Optus has an enviable record in the delivery of broadband cable and dialup services, with users consistently rating its customer service and technical support highly in ACNielsen.consults regular survey of ISP user satisfaction. Subscribers to the new OptusNet DSL service will enjoy the same round-the-clock support and competitive pricing.

If you already have an OptusNet-approved DSL modem, you can save $90 on installation costs.

What the analysts are saying

Regarding a price war:

"In this instance, product quality and customer service become critical. Optus' cable broadband product is widely recognised in the marketplace as being of extremely high quality."

Goldman Sachs JB Were

"We believe Optus has a slightly higher market share of cable broadband customers in areas where there is an overlap of the HFC networks. If Telstra is to reverse this situation, either the quality of their product will have to increase to a level comparable to Optus or further price decreases may be necessary."

Goldman Sachs JB Were

However, while the increase in the number of broadband suppliers made possible by the introduction of DSL has led to greater competition and more choice for consumers, there are also new pitfalls to watch out for.

Some broadband suppliers expect users to be more self-sufficient or they cut back on phone assistance outside of normal business hours. Others offer attractive rates by failing to invest in new bandwidth and network capacity. Still others make their profits through punitive excess data charges.

Many users have experienced difficulty in finding a reliable service and effective support. Some major providers have had serious outages, especially with email, undermining users' confidence in their service. Many subscribers switch suppliers — or 'churn' — as a result.

Other broadband users changed ISPs to avoid punitive excess data charging. Some providers still meter both download and upload traffic, triggering excess data charges faster than other providers.

Torn between untried broadband providers with slick pricing plans and the 'default' DSL provider, it's no wonder that many thoughtful users have become wary about the way ahead.

OptusNet DSL — your questions answered

How fast is DSL?

The OptusNet DSL standard speed — 512 kilobits per second (Kbps) — is up to 15 times faster than a standard dialup modem when surfing Web sites located in Australia. If you need faster speeds, the premium speed (1,500Kbps) option is up to 45 times faster than a standard dialup modem on Web sites located in Australia. If you are downloading from an overseas site, it will be hard to tell the difference, because downloads are subject to traffic on undersea cables. You should get an average download of about 40 kilobytes of data per second on a 512Kbps/128Kbps plan.

Why go to Optus for DSL if it uses infrastructure available to everyone else?

Optus repackages the wholesale service into a retail service. It owns the end product and the customer-product construct is a key determinant in the quality of any broadband product. This is the first stage of Optus' DSL strategy. Build-out is an option when it achieves critical mass by exchange area. Both the core of the OptusNet service (email servers, connections the Internet backbone, authentication and billing platforms) as well as the end-user DSL CD and software are customised, proprietary elements designed specifically to give OptusNet customers a DSL experience that is excellent. OptusNet's DSL platform ensures the network and access to the Internet has been properly engineered and capable of scaling up with demand.

Why choose OptusNet DSL when there are many other non-Telstra DSL providers?

OptusNet DSL offers simple, hassle-free, high-speed broadband Internet access through your phone line. It is a complete ISP service — it does not charge excess usage fees, and it offers 512Kbps speed, value for money (up to 100 free local calls per month, discounts on installation and monthly access fees), a reliable network and excellent customer service. Ultimately, it's a matter of user satisfaction — just ask an OptusNet Dialup or Cable customer.

Can my home be connected to OptusNet DSL?

You will need to contact Optus on 1800 505 005 to confirm that your premises can be connected to its DSL service.

What do I need to get started?

You need a standard phone line and a computer that meets the minimum system requirements. Optus can supply their OptusNet DSL broadband self-installation kit, which contains your DSL modem, two telephone filters and an easy-to-use installation CD-ROM. Alternatively, you can supply your own Optus Network Approved modem and filters and save $90 on the cost of installation.

How much does OptusNet DSL cost?

After your one-off connection fee of $149 or $329 (depending on whether you opt for the 'yes' rewards bundle), OptusNet DSL will be available to you for a fixed monthly subscription rate. There are no metered or 'per megabyte' excess charges. Instead, you get a monthly data allowance based on the plan you choose and if you exceed this allowance, your service is simply 'speed throttled' to dialup speeds. For more detailed information on pricing, please view the rate card at www.optus.com.au/optusnetdsl_pricing.

What about connection fee costs to OptusNet DSL Broadband?

Connection fee	Self-installation including DSL modem
With 'yes' rewards package	$149
Standalone	$329

* Bring your own Optus Network Approved modem and receive a $90 discount.

Can I use my own DSL modem/router?

You can use your own DSL modem when signing up for the OptusNet DSL service, as long as your modem is one of those approved for use on the network (see www.optus.com.au for the list of approved models). If you choose this option, you get a $90 discount on the connection fee. This will make a lot of sense if you want to use a modem that is available on a local network or router.

How do I subscribe to OptusNet DSL?

You can subscribe to OptusNet DSL via a toll-free number — 1800 505 005.

Can I have more than one email address?

OptusNet DSL Broadband includes up to five email addresses. Plus you get 10MB of Web space where you can publish your own homepage.

If I don't subscribe to local and long-distance telephone services from Optus, can I still get OptusNet DSL Broadband?

Yes. You are not obliged to subscribe to Optus telephone services to receive OptusNet DSL. However, you can enjoy substantial savings on all your communications needs, by combining your services into one of the great value 'yes' rewards phone/DSL packages.

What kind of customer service and support does OptusNet DSL offer?

OptusNet DSL provides dedicated customer support 24 hours a day, seven days a week on 1300 309 333. As an OptusNet DSL customer, you can also access comprehensive online help from the OptusNet DSL customer portal.

The OptusNet way: it's all in the planning

Optus pioneered 'speed throttling' as a better way of coping with excessive data traffic limits and managing network loads, giving users the comfort of fixed monthly charges.

Broadband household penetration in Optus-cabled areas is four times greater than in non-Optus areas and Optus continues to enjoy majority marketshare for cable broadband services where it competes. Its success as an ISP is founded on customer support, competitive pricing and providing a service free of busy signals and outages.

OptusNet's expansion into DSL has been planned for some time and following the broadband cable product construct it has focused on delivering clear, simple plans and pricing backed by reliability and customer support.

To make sure it launched the best DSL service possible, Optus undertook a three-month trial to identify and cope with complex aspects of the user support environment including:

- user interface
- customer support
- online account management and data usage tools
- the installation process, and
- the DSL technology.

Users from New South Wales, the ACT, Queensland, Victoria, South Australia and Western Australia took part in the trials, putting all elements of the product through its paces.

OptusNet DSL highlights

- **Flat monthly pricing with no financial penalties for excess downloads — Optus simply applies a speed limit***
- **512Kbps speed for all plans**
- **12-month contract for all plans**
- **Residential bundled benefits — up to 100 free local calls, discounts on DSL installation and monthly access fees**
- **Easy self-installation**
- **512Kbps speeds plans from only $39.95 a month for 300MB**
- **Add $29 per month to your monthly fee to upgrade to the premium speed option of 1,500Kbps**

** Exceeding monthly data allowance will see your speed limited to between 20Kbps and 28.8Kbps until the first day of the next billing month. Unused data allowance cannot be rolled into subsequent months.*

OptusNet DSL pricing plans

Plan	Monthly fee with a 'yes' rewards package***	Monthly fee standalone
DSL Starter 300MB	$39.95	$59.95
DSL Lite 1GB	$49.94	$69.95
DSL Unlimited*	$69.95	$89.95
DSL Unlimited Pro**	$99.95	$129.95

** Unlimited downloads. Speed limiting applies after 12GB.*
*** Unlimited downloads. Speed limiting applies after 20GB.*
**** You get special discounts when you switch your local and long-distance phone services to Optus.*
Prices correct as at March 1, 2004.

A smarter broadband plan

A key conclusion from the trial was the need to sidestep entry level plans that had attractive pricing but saddled users with borderline broadband performance of 256Kbps download speeds or traffic quotas. If broadband was going to be promoted for services such as streaming multimedia, 256Kbps would just not cut it.

Optus avoided confusing contract periods in favour of a 12-month contract and a default broadband download speed of 512Kbps across all plans. For the highest data users, instead of forcing a 1,500Kbps and its associated cost to them, OptusNet makes this premium speed a clear-cut option for an extra $29 a month.

In addition, the trial reinforced the appeal of the discounts offered by Optus for selecting its other services such as subscription TV and telephony. The Optus 'yes' rewards package offers bundled services with up to 100 free local calls per month and discounts on installation.

While the trial identified areas for improvements, it confirmed that the technology was robust, that OptusNet's back-end systems and processes were working well, and that the customised OptusNet self-installation process, featuring a DSL modem and CD-ROM installation were user-friendly.

This thumbs-up saw Optus' new residential DSL product, OptusNet DSL, launch two weeks ahead of schedule. It is now available in metropolitan and many regional areas of New South Wales, the ACT, Queensland, Victoria, South Australia and Western Australia.

To sign up to the service, call Optus on 1800 505 005.

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